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Translation and Analysis of the document “Lípidos, Lipoproteínas y Aterogénesis” from Spanish into English and “Perfect Health” from English into Spanish for Hospital Mexico

**Thesis Submitted to Obtain the Bachelor’s Degree in English**

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## **Abstract**

This research addresses the problem of how translation techniques can improve the accuracy and readability of medical and health texts, focusing on the translation of the texts “Perfect Health” by Deepak Chopra and “Lípidos, lipoproteínas y aterogénesis.” The aim of the study is to ensure effective cross-linguistic communication in healthcare environments, in particular by adapting specialized medical terminology. The methodology used was the qualitative, as the thesis combined textual analysis, translation techniques such as semantic and communicative translation, and the development of glossaries to facilitate the understanding of complex and difficult-to-understand vocabulary. The main results revealed that the application of specific translation strategies such as modulation, explicitation, literal translation, and the use of other glossaries significantly improved the accuracy and readability of translated texts. The study concluded that effective translation in the medical field requires not only linguistic accuracy, but also research skills and attention to detail. Ultimately, this research contributes to the field of translation studies by serving as an example for future translators of medical and scientific texts; in this case, ensuring both technical accuracy and accessibility for diverse audiences.

## Resumen

Esta investigación se centra en el estudio de cómo las técnicas de traducción pueden mejorar la precisión y legibilidad de los textos médicos y de salud, centrándose en la traducción de los textos “*Perfect Health*” de Deepak Chopra y “*Lípidos, lipoproteínas y aterogénesis*”. El objetivo del estudio es garantizar un intercambio lingüístico eficaz en entornos médicos y científicos, en particular mediante la adaptación de la terminología médica especializada. La metodología empleada es cualitativa y combina el análisis textual, técnicas de traducción como la traducción semántica y comunicativa, y la elaboración de glosarios para facilitar la comprensión de vocabulario complejo y difícil de entender. Los principales resultados revelan que la aplicación de estrategias de traducción específicas, como la modulación, la explicitación, la traducción literal, y el uso de otros glosarios, mejora significativamente la precisión y la legibilidad de los textos traducidos. El estudio concluye que la traducción eficaz en el ámbito médico requiere no sólo precisión lingüística, sino también capacidad de investigación y atención a los detalles. En última instancia, esta investigación contribuye al campo de los estudios de traducción al servir de ejemplo para futuros traductores de textos médicos y científicos; en este caso, que garantiza tanto la precisión técnica como la accesibilidad para diversos públicos.

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# Chapter I

## Introductory Framework

Effective communication of medical and healthcare information in multiple languages is essential in today's increasingly interconnected and globalized society. With the rise of globalization, interactions between people from different linguistic and cultural backgrounds are becoming more frequent, requiring greater emphasis on clear and accurate communication in the healthcare sector. In this context, precise translations of medical texts are crucial in bridging the gap between languages and ensuring that vital healthcare information is accessible to all. The accuracy of translations takes on particular importance given the highly specialized nature of medical terminology, which often contains specific information. In addition, cultural aspects must also be considered, as they can significantly influence how different audiences interpret and understand healthcare information.

Misunderstandings in medical communication can have serious consequences, such as inadequate patient care, incorrect therapeutic decisions, and a general lack of trust in healthcare systems. With these factors in mind, this research aims to identify the most effective ways to improve the quality of healthcare information. With these factors in mind, the aim of this research is to conduct a full exploration of translation techniques specific to medical texts, with a particular focus on adapting these strategies to meet the high standards expected in the healthcare setting.

## **1.1 Problem Statement**

**How can translation techniques be used to improve the accuracy and readability of medical and holistic health texts, with particular focus on 'Lípidos, Lipoproteínas y Aterogénesis' and 'Perfect Health' by Deepak Chopra, to ensure effective communication across languages in healthcare settings?**

Effective communication of health and medical information across languages requires not only accurate translation but also an understanding of specialized terminology and cultural nuances. In the fields of holistic medicine and lipid research, precise terminology, culturally adapted explanations, and clear language are crucial to avoid potential misunderstandings. The current translations of key texts “Lípidos, Lipoproteínas y Aterogénesis” and “Perfect Health” by Deepak Chopra, may lack the specialized accuracy and cultural adaptation necessary to ensure effective patient education and medical professional comprehension. This study aims to examine the translation methods used in these medical and health texts, focusing on the selection and impact of translation techniques to ensure they meet the specialized standards for the medical field.

## **1.2 Objectives of the Investigation**

### **1.2.1 General Objectives**

To analyze the effectiveness of translation techniques for accurately translating medical texts in holistic health and lipid research

### **1.2.2 Specific Objectives.**

- To translate the texts “Lípidos, Lipoproteínas y Aterogénesis” and “Perfect Health” to effectively achieve coherent and accurate target texts

- To apply translation techniques for medical terminology and patient-oriented language within the documents as a way of rendering a coherent and precise target text.
- To evaluate the translations' effectiveness in terms of accuracy and readability,
- To develop a glossary of essential medical and holistic health terms found in both texts ensuring terminological consistency.

### **1.3 Justification of the Study**

The research aims to address the need for accurate and culturally sensitive translations in the fields of holistic medicine and lipid research, focusing on translation methods applied to key medical texts to improve the understanding and communication of health information in different languages. This study is aimed at multiple audiences, including translation students, who will obtain information on specialized techniques that enhance their ability to convey complex medical terminology effectively, providing a useful resource that bridges theoretical knowledge and real-world application in healthcare translation. Healthcare professionals will also benefit, as the research highlights the importance of accurate terminology and culturally adapted content for effective patient communication and education.

Moreover, translation professionals will find the study relevant, as it shows updated strategies and best practices that can improve their approaches and enhance the quality of their translations, ultimately improving readers' experience. In addition, health communication researchers can benefit from the findings, which highlight the impact of translation techniques on the accessibility and comprehension of medical information for diverse audiences. By highlighting the importance of accurate translation in health communication, this research aims to expand the knowledge in this field and promote the development of effective translation practices that benefit readers.

## 1.4 Antecedents

The thesis “Analysis and evaluation of the translation procedures found in the documents ‘Extreme Poverty as a Human Rights Violation’ by César Manso-Sayao Atmetlla and ‘Management for Social Transformation’ by Silvia Navarro Morúa presents an in-depth analysis of the translation techniques applied to two different texts. The first paper “Extreme Poverty as a Violation of Human Rights” addresses issues related to human rights and poverty, which requires a careful and culturally adapted translation of complex legal and social concepts from English into Spanish. Navarro Morúa discusses the translation procedures employed, highlighting how the translator explored cultural differences, legal terminology, and the challenge of preserving the tone and intent of the original work.

The second document “Gestión para los Derechos Humanos” discusses the translation procedures employed, emphasizing how the translator explored cultural differences, legal terminology, and the challenge of preserving the tone and intent of the original work. This translation highlights the need to effectively communicate social and community-centered concepts, emphasizing the importance of clarity and precision in formulating the objectives and social impact of a nonprofit organization. Navarro Morúa's analysis evaluates the translation strategies employed to convey specialized terminology and ideas related to social change, ensuring that the target English-speaking audience can fully grasp the intended message.

This thesis is highly relevant to the research, as it offers a broad perspective on translation procedures in specialized fields, although in this case, it focuses on the social sciences and human rights. Since this research focuses on specialized translation in the field of health and the human body, Navarro Morúa's study provides valuable information on the challenges

translators face when working with complex and specialized content. The evaluation of translation techniques in these documents can be used as a reference for the method of translating health-related texts, emphasizing the need for accuracy, cultural sensitivity, and clarity when conveying specialized knowledge to linguistically and culturally diverse audiences. Furthermore, the translation theories and procedures outlined in this thesis can be adapted to improve the translation of health-related texts.

In Graciela Echavarría Silva's thesis, "Translation and Analysis of Documents from Spanish to English and vice versa: a study of translation techniques and methods", Silva explores the application of different translation techniques to documents translated between Spanish and English, focusing specifically on the texts concerning Apartotel Don Francisco. Silva adopts a mixed methods approach that integrates qualitative and quantitative analysis to assess the quality of these translations. This methodology allows her to evaluate the effectiveness of the various translation procedures, the accuracy of the terminology, and the overall impact of the translation techniques on the accuracy and clarity of the final text. To facilitate a complete analysis of the translation process, she uses glossaries, color-coding, and text analysis charts, allowing for a detailed analysis of the different techniques applied to various types of documents, including legal documents and guest reviews. Silva's research also addresses the challenges translators face when working with different text types and explores how these challenges can be mitigated using specific translation strategies.

Several aspects of Silva's thesis are particularly relevant to the aims of this research, which focus on the analysis and application of specialized translation techniques to medical texts in the field of holistic health and lipid research. Silva's method of examining and applying translation techniques can be adapted easily to evaluate how specialized medical terminology is

managed, ensuring both accuracy and consistency in all translations. In addition, her research on the relationship between translation methods and the quality of the final product, especially in terms of readability, accuracy, and cultural relevance, is quite in line to produce translations that are not only accurate but also culturally adapted to academic and healthcare audiences. The use of glossaries to maintain terminological consistency in Silva's research coincides with the development of a specific glossary for essential medical and holistic health terms. By assessing the effectiveness of translation techniques about linguistic accuracy and cultural sensitivity, Silva's methodologies will help to evaluate the extent to which translations meet readers' expectations, thus helping to guarantee that the translated texts are understandable and culturally appropriate.

The thesis "Analysis of the procedures and methods used in the translation of documents from Spanish to English and from English to Spanish for the Corcovado Foundation" by Sofía Alejandra Gómez Tábores, delves into the complex translation process, with special emphasis on the procedures and methods used to achieve accuracy and naturalness in the final translated documents. The paper is based on a series of supporting sources, such as books, digital articles, and academic papers, which provide key information on the theoretical and practical aspects of translation. In addition, the research incorporates tertiary sources such as glossaries, dictionaries, and student essays, which help to collect and organize complex terminology and concepts, thus facilitating the translator's work.

In addition, according to Tábores essential translation procedures, such as transposition, modulation, omission, amplification, explicitation, and literal translation, are crucial for adapting source material to the target language while maintaining fidelity and fluency. In methodology, tools such as color coding, glossaries, and text analysis charts play a key role in organizing and

structuring the translation process. Thus, the color-coding system visually classifies the application of the different translation procedures, providing clarity to the translator's decisions and ensuring consistent application throughout the document. In terms of the glossary, difficult terminology is defined and contextualized, while the text analysis chart provides a better understanding of the style, function, formality, and tone of the source text. By employing the tools and methods outlined by Tábores, this research aims to achieve better consistency and clarity in the translation process. By employing the tools and methods outlined by Tábores, this research aims to achieve better consistency and clarity in the translation process, since these elements are important to this research, as they create the necessary focus for accurate, natural, and well-contextualized translations.

The thesis by Andrés Gutiérrez López, "Propuesta Dique de Cierre Sector Este" from Spanish to English and "Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis" from English to Spanish, both for Insuma is a study on the translation of specialized documents; his research focused on the translation of specialized documents. Her approach highlights the challenges of translating highly technical texts, such as the need to preserve the accuracy of specialized terminology, maintain the level of formality and complexity of the original text, and achieve an accurate translation of the original text. What resonates most in his work is his emphasis on the versatile nature of text analysis and its translation application. In addition, the identification of narrative, descriptive, discussion, and dialogue textual styles and their respective expressive, informative, or vocative functions is especially relevant to this research.

These insights will serve to adapt the tone and intent of the texts to be translated in this thesis while ensuring that the main content of the text remains intact. In addition, his approach to

formality, which distinguishes between technical, neutral, or idiomatic language, provides a useful tool for adapting translations to the intended audience, while respecting the purposes of the source text.

The thesis of Sebastián André López Ávila Translation and analysis of documents from English to Spanish and Spanish to English for the Escuela Secundaria Técnica Profesional INVU Las Cañas focuses on the translation and analysis of professional documents between English and Spanish. The research employs three main data collection instruments: a text analysis table, glossaries, and the translation of specific documents. The text analysis chart is used to evaluate the translated texts in terms of style, function, and formality, following the guidelines established by Newmark in his theoretical framework. Glossaries, created in both languages, contain definitions, grammatical categories, and terminology relevant to the field, and play a crucial role in ensuring accuracy and consistency of terminology in both languages. The data collection process begins with a detailed reading of the original documents, followed by the translation phase. Once completed, the translations are reviewed by experts in both languages to ensure grammatical accuracy and cultural appropriateness.

In turn, the translated documents are analyzed using the text analysis chart, focusing on the main translation techniques and procedures. The development of glossaries also helps Lopez Avila to understand and accurately translate unfamiliar terms, thus ensuring a high level of accuracy. This thesis is particularly relevant to this research as it exemplifies a specific approach to translation. In addition, the use of a text analysis table can provide valuable information on the effectiveness of different translation techniques, while the creation of glossaries is a useful tool for translating specialized terminology. All of this will help to ensure that clear and accurate translations are produced in this document.

## 1.5 Scope

This study is dedicated to the detailed analysis and application of specialized translation techniques in the field of medical texts, with special emphasis on holistic health and lipid research. The selected works, "Lipids, Lipoproteins and Atherogenesis" and "Perfect Health" by Deepak Chopra, will be used as case studies to explore the challenges of translating health information while ensuring accuracy, clarity, and cultural sensitivity.

1. Linguistic and cultural analysis: This section will delve into the linguistic and cultural elements embedded in the selected texts, focusing on the identification and interpretation of specialized terminology that may influence comprehension and communication.
2. Application of specific translation techniques: Specific translation strategies designed to effectively address the unique challenges posed by the fields of medicine and holistic health will be applied. This approach ensures that translations maintain technical accuracy while remaining accessible to readers of the texts.
3. Evaluation of translation effectiveness: The study will evaluate the effectiveness of the techniques applied by reviewing translated materials for accuracy, readability, and cultural appropriateness, ensuring that the needs of diverse audiences are met.
4. Development of a specialized glossary: A glossary of essential terms related to medical terminology will be created, which will provide a valuable resource for future translations in these related fields.

## **Chapter II**

### **Theoretical Framework**

Translation is a complex process that goes beyond linguistic equivalence; it requires in-depth knowledge of both the source and target languages, as well as their respective cultural and social contexts. The principles of translation studies provide essential tools to overcome these challenges by understanding the dynamics of meaning transfer, stylistic adaptation, and cultural mediation. This chapter explores these essential concepts, focusing on text analysis, translation strategies, and practical methodologies that shape translators' work.

The chapter discusses the importance of text types and their importance on translation, citing key theories such as Mary Snell-Hornby's classification of text types and Katharina Reiss's communicative purpose approach; these concepts demonstrate their role in texts and impact on translation. In addition, the chapter examines stylistic considerations, such as levels of formality, complexity, and emotional tone, which require careful attention to ensure both the accuracy and cultural relevance of the translated text. Moreover, specific translation methods and techniques are addressed, such as semantic and communicative translation; and processes such as transposition, modulation, omission, and amplification. In addition, the chapter explains the importance of glossaries for maintaining consistency and accuracy, especially in specialized fields. By providing translators with reliable references for terms to be used in future translations, this chapter offers a broad context for understanding the most important aspects of translation, addressing both theoretical perspectives and practical applications.

## ***2.1 Text Analysis***

### **2.1.1 Text Styles**

Mary Snell-Hornby's approach to text types and translation provides a broad context for placing translation in a space that includes literary, general, and specialized texts. As Snell-Hornby emphasizes, “translation is a process that requires an understanding of both the cultural and linguistic systems involved” (New University In Exile Consortium, 2016). This approach classifies texts according to their different levels of complexity and purpose, where literary works, such as poetry and film scripts, prioritize creative expression. In contrast, general texts, such as newspapers, focus primarily on the diffusion of information. However, this framework has been criticized for including various forms, such as advertising and creative works, in broad general categories that may obscure their unique artistic qualities.

Reiss argues that “texts in translation need to be classified according to their communicative purpose” (New University In Exile Consortium, 2016), offering a more precise classification of texts into informative, expressive, and operative. Informative texts prioritize clarity and precision, expressive texts emphasize artistic style and emotional impact, while operative texts aim to persuade or inspire action. Reiss' approach also recognizes hybrid forms that combine these functions, although it has been criticized for not adequately addressing the interaction of complementary elements and the influence of sociocultural factors. As Snell-Hornby notes, “the nature of the text determines the translation method” (New University In Exile Consortium, 2016). Based on these ideas, Snell-Hornby uses cultural, literary, and specialized contexts to address the complexities of translation in depth. Both approaches

emphasize the importance of understanding the type and function of the text and adapting translation strategies to the intended purpose and cultural context of the source text. By considering these theoretical perspectives in their totality, translators can obtain useful knowledge to deal with a wide range of genres, from technical writing to works of literature.

## **2.1.2 Stylistic Scales.**

### ***2.1.2.1 Scale of Formality***

Formality in language is usually defined by the specific types of words and structures used in a given context. Formal language is based on grammatical categories that transmit objectivity and distance. For example, formal language tends to feature a higher frequency of nouns, adjectives, articles, and prepositions, while informal language tends to favor verbs, pronouns, and adverbs. Dewaele (1996) notes that “the more formal the linguistic extract, the higher the F-value is expected to be.” Here, the term “F” is used as a measure to quantify formality, as higher scores indicate a more formal communication style. This distinction is crucial in both spoken and written forms, as formal language is usually employed in professional, academic, or official contexts, while informal language predominates in casual interactions.

Moreover, the prevalence of verbs in informal contexts tends to increase, as they often denote more dynamic actions and are closely linked to specific contexts. In contrast, formal expressions may adopt noun phrases, such as “the destruction of a building,” which decrease the need for important context specification. Levelt (1989) stated that “inflected verbs are intrinsically deictic because they implicitly refer to a particular tense through their tense.” This demonstrates how linguistic structures can significantly influence perceived levels of formality. When comparing informal and formal speaking styles, the use of pronouns, adverbs, and interjections tends to be less frequent in formal contexts, as these elements rely heavily on

contextual references, which are usually avoided in formal communication. The frequency of conjunctions, however, is not affected by formality, as they are mainly used to structure sentences without communicating context or subjectivity. Therefore, it is not unexpected that “the frequency of conjunctions had no special relation to formality” (Heylighen & Dewaele, n.d.). In practice, formality is influenced not only by word categories but also by the speaker's method of expressing ideas, whether through dynamic verbs or static nouns. Formal language usually tends toward abstract concepts and general principles, so “a speaker using a formal style will prefer to use nouns” (Heylighen & Dewaele, n.d.). As a result, a speaker's choice of words may prove to be an indicator of the context.

#### *2.1.2.2 Scale of Generality or Difficulty*

The difficulty of translation may be due to several factors, including the complexity of the source text and the translator's skills in navigating linguistic and cultural differences. Although it is often stated that “as readability increases, translation difficulty tends to decrease” (Sun, 2015), the correlation between these two variables is relatively weak. This indicates that better readability does not always guarantee easier translations. A major challenge in the translation process is the inconsistency in the way different translators perceive difficulty; some may find simple texts difficult, while others may struggle with more complex texts. This variability highlights the subjective nature of translation, as “translation difficulty scores tend to vary widely among individuals.”

Another important factor contributing to translation difficulty is the presence of time limits. Although long translation periods might suggest an increase in difficulty, this relationship is not always direct. As noted, “high-performing translators may finish earlier than low-performing translators” (Sun, 2015), indicating that efficiency is not necessarily related to the

simplicity of the task. In addition, some texts are more complex in themselves, as they are characterized by specialized vocabulary, complex sentence structures, or culturally specific references, which can be more challenging even for more experienced translators. On the other hand, "one's own predicted level of translation difficulty can significantly influence actual performance" (Sun, 2015), as some translators may identify difficulties in advance that ultimately do not appear. Ultimately, predicting the difficulty of a text is a difficult task. Despite attempts to use readability methods, it has been observed that "the correlation between readability scores and translation difficulty is weak" (Sun, 2015), suggesting that these tools are not entirely effective. Therefore, it is important to recognize that translation difficulty does not depend only on the complexity of the text but also on individual skills and personal experiences. Furthermore, "the relationship between translation difficulty and factors such as sentence length or word complexity varies significantly" (Sun, 2015), demonstrating that personal experience plays a crucial role in overcoming these challenges.

### ***2.1.2.3 Scale of Emotional Tone***

Emotional tone in translation is vital for interpreting, for example, literary works in different languages and cultures. The translation is more than a simple linguistic adaptation; it acts as a cultural tool that requires the maintenance of the emotional tone of the source text, whether joyful, melancholic, or sad, to achieve a similar impact in the target language. This process requires an understanding of the cultural contexts that shape emotional expression. As noted, "language reflects the culture from which it originates, intertwining with history, traditions, and social values" (Karimova, 2024). Translators must find a balance between fidelity to the original text and adapting the emotional tone, especially when dealing with culturally specific idioms and references that lack direct equivalents.

According to Karimova, "translators must make choices about how to deal with elements specific to the source culture" (2024) while maintaining the same emotion. In addition, translators must interpret both linguistic and emotional expressions. They are "far from invisible; they act as cultural mediators, interpreting and adapting the text to bridge linguistic and cultural differences." (Karimova, 2024). This function requires a deep knowledge of both languages and the ability to convey emotions while preserving the intent of the original text. Consequently, maintaining the emotional tone is vital to ensure that the impact of literary work transcends language barriers. As Karimova mentions, "the essence of translation lies in finding a balance between the original meaning and the linguistic and cultural expectations of the target language" (2024), thus ensuring that the translation is faithful and accurate.

### **2.1.3 Text Function.**

#### ***2.1.3.1 Informative***

Informative texts are a different category of written texts primarily intended to transmit facts, explanations, or instructions. Zheng claims that "science and technology texts belong to what we call a typical and distinctive type of informational texts" (2017), focusing on conveying factual and objective content to the reader. Moreover, their main objective is to inform or educate by presenting clear and direct information related to specific topics such as science, technology, history, or current affairs. The language used in these texts "is characterized by conciseness, precision, objectivity, practicality, brevity, and concreteness" (Zheng, 2017), which guarantees that complex information is easily accessible. In these texts, directness and simplicity predominate, and precision, clarity, and logical organization are given great emphasis.

Writers of informative texts seek objectivity, avoiding personal opinions, emotions, and persuasion. As Zheng mentioned, "In technical translation, the primary function is to inform the

reader about technical information and real-world phenomena" (2017), which reflects how technical texts aim to communicate specific knowledge without complications. "The main task is to inform readers with certain scientific facts and content" (Zheng, 2017), which differentiates informative writing from other forms such as literary or persuasive writing. Unlike creative or literary writing, informational texts are not intended to entertain or evoke emotions; their only purpose is to communicate reliable information. Zheng states that "content-focused texts demand invariance in the transfer of their content" (2017), emphasizing the goal of conveying accurate information from the source to the intended audience without changing its meaning. This accuracy makes them frequent in academic papers, scientific reports, user manuals, and journalistic articles, where the credibility of the writer plays a very important role since readers depend on the accuracy of the information provided.

### *2.1.3.2 Expressive*

Expressive texts are closely related to the authors' identities and often reflect their personal experiences, emotions, and points of view. This type of text is characterized by focusing on the emotional and personal aspects of the writer's inner self, and genres such as literature, autobiographies, and personal letters are examples of this. Unlike texts that only exchange information, expressive texts aim to transmit the author's perspective, which requires careful translation to preserve the emotional tone, style, and the writer's voice. As mentioned, "expressive texts include serious imaginative literature, authoritative statements, autobiographies, and personal correspondences" (Wang, 2018).

Furthermore, when translating expressive texts, the goal is to capture the same author's message in a way that reaches the target audience. This process may require the adaptation of linguistic structures to maintain the emotional or literary effects in the target language. Unlike

informational texts “where clarity and precision prevail” (Wang, 2018), expressive texts require a deeper interpretation of the original, in which personal tone and emotional depth must be faithfully reflected. As Newmark points out, “expressive texts encompass a wide range of forms, including serious imaginative literature and personal correspondences” (Wang, 2018). As Newmark suggests, adopting semantic translation for expressive texts is essential, as it aims to transmit the original meaning as accurately as possible to the second language. Thus, this approach emphasizes the importance of the translator's role not only in conveying information but also in portraying the same intention of the original text.

### *2.1.3.3 Vocative*

Vocative texts, such as advertisements, form a specific category within translation studies. These texts are created to persuade and influence the target audience and often incorporate cultural references and strategies that appeal to emotions. As Cojocaru points out, “vocative texts, such as advertisements, constitute a distinct category in translation studies, characterized by their persuasive nature aimed at influencing the target audience” (2014). The translation of these texts requires more than a simple linguistic translation; it involves adapting the message to fit the cultural and social norms of the target language. In this context, a communicative method is usually employed, which focuses on conveying the general meaning of the message rather than strictly following its original form.

According to Cojocaru, “the translation of vocative texts usually involves a communicative approach, giving priority to the overall semantics of the message rather than focusing on a strict form” (2014). The translator must ensure that the essence and persuasive intent of the original announcement are preserved while adjusting to language-specific structures and cultural aspects. This task presents several challenges, including the possible lack of

semantics, as cultural aspects and implicit content may not have direct equivalents in the target language. In addition, translators must adapt persuasive elements, such as expert endorsements and cultural topics common in advertising. As Cojocaru remarks, “the strategies employed in the translation of vocative texts takes into account both linguistic and cultural elements, ensuring that the core message is not lost” (2014). Ultimately, effective translation ensures that the persuasive power of the ad is maintained while making it culturally relevant and impactful to the target audience.

## **2.1.4 Translation Methods**

### ***2.1.4.1 Semantic translation***

Semantic translation is a strategic process that prioritizes preserving the original meaning of a text by adapting it to the target language in a culturally and contextually appropriate way. This method goes beyond just word-for-word translation by taking into account the full context, idiomatic expressions, and cultural nuances to ensure that the intended message is fully understood by the target audience. By emphasizing meaning over form, semantic translation aims to preserve the essence of the source text, enhancing clarity and fluency in the target language. As Rietveld indicates, “semantic translation seeks to preserve the meaning of the source text while adapting its structure to the norms of the target language. It emphasizes accuracy of the message over a literal word-for-word approach” (2019).

One of the main advantages of semantic translation is its ability to deal with terms or cultural expressions that lack direct equivalents in the target language. When dealing with such terms, translators may employ techniques such as paraphrasing, borrowing, or generalization to find suitable alternatives that capture the intended meaning. For example, words associated with cultural practices or objects that do not exist in the target culture can be explained in a way that

maintains their meaning while enhancing comprehension for the reader. As Rietveld emphasizes, "Unlike formal equivalence, which focuses on direct translation, semantic translation accommodates cultural context and idiomatic expressions to maintain both meaning and readability in the target language" (2019). In conclusion, semantic translation is a versatile and in-context method that prioritizes meaning over strict equivalent, making it a valuable tool for overcoming linguistic and cultural differences. It is especially valuable in fields that require cultural sensitivity and effective communication, such as literature, marketing, and diplomacy.

#### ***2.1.4.2 Communicative translation***

Communicative translation is a method that emphasizes the importance of cultural context in delivering the meaning of texts. This method gives priority to the impact of the translation on the target audience rather than strictly following the literal meaning of the source text. As explained in the text, communicative translation "does not seek to find a linguistic equivalence, but rather to assess the cultural context and ensure that the essence of the source text matches that of the target text" (Gonzalez-Bueno, 2021). This approach is especially beneficial when dealing with culturally sensitive content, as it allows translators to adapt messages to resonate with the values and norms of the target culture. For example, the translation of the term "Black Friday" into Turkish faced negative reactions because its literal translation, "Kara Cuma," had negative connotations in Turkish culture. In response, companies began using terms such as "Efsane Cuma" or "Muhteşem Cuma," meaning "legendary Friday" or "magnificent Friday," illustrating how communicative translation can effectively overcome cultural sensitivities.

Moreover, communicative translation is not only limited to marketing but also applies to various fields, such as legal texts and the media. Although legal translations often require a strict

use of terminology, the communicative approach can improve comprehension by taking cultural aspects into account. As Gonzalez-Bueno points out, “the need for it often arises in the fields of marketing, law, website localization, and the media” (2021). In summary, this method of translation plays a crucial role in facilitating cross-cultural communication, as it allows the original texts to maintain the desired impact while adapting to different audiences. In an increasingly globally connected world, communicative translation is essential to overcome cultural differences and ensure the fidelity of texts.

## **2.2 Translation Procedures.**

### **2.2.1 Transposition.**

Transposition in translation involves changing the grammatical structure or linguistic elements to adapt to the differences between the source and target languages, as demonstrated by the translation of Kim Yu Jeong's novel "Ttaengbyeot" into 'Sengat Matahari.'. This study identified 179 cases of transposition, classified into five types, with changes in structure being the most common, highlighting the importance of adapting to the different syntactic rules of Korean and Indonesian in this case. For example, according to Widyadari et al., “the structural differences that occur are mainly due to the different predicate positions between Korean and Indonesian” (2021). By employing transposition, translators can simplify complex sentences and ensure that the meaning reaches the target audience, which is crucial for effective literary translation. The analysis showed that transposition not only helps resolve linguistic differences but also clarifies unfamiliar terms that may not have direct equivalents in the target language. As emphasized in the findings, this adaptability is essential, as “the transposition used to adjust the Korean translation results to the Indonesian sentence structure” (Widyadari et al., 2021), is what makes the text comprehensible to readers. Ultimately, the research emphasizes that

understanding the concept of transposition is vital to ensure that the essence of a literary work is preserved while making it accessible to readers.

### **2.2.2 Modulation.**

Modulation, or change of meaning within the translation process, is essential for effective communication between languages, as highlighted in Rahmatillah's research. The study emphasizes that “translators must achieve...the primary goal” (Rahmatillah, 2017) of conveying accurate meaning, which goes beyond mere linguistic competence. This qualitative research analyzed translations of a training module on assisting victims of violence against women and excerpts from Hatim's work on translation. Its specific objective was to identify different patterns of modulation of meaning and to evaluate whether these patterns give place to different implications or retain the same meaning.

The results indicated that although the sentence structure often changed, for example, when converting passive constructions in Indonesian to active forms in English, the “overall meaning remained the same” (Rahmatillah, 2017). Rahmatillah's results classify modulation into two categories: obligatory modulation, which is necessary due to the lack of equivalent terms in the target language, and free modulation, which is used to clarify meaning and increase the naturalness of the translation. For example, the translation of passive sentences into active voice not only conformed to English grammatical rules but also communicated the intended message. This adjustment is crucial, as “the translator's attention is focused not only on the transfer of the meaning of a word but extends to the transfer of the message” (Rahmatillah, 2017). Ultimately, the research concludes that modulation, although often considered a challenge, is a natural phenomenon in translation. As such, translators must prioritize content over form to ensure that the message delivered resonates with the target audience. Thus, the essence of translation lies in

understanding that “the translator only acts as a messenger of the author of the source text” (Rahmatillah, 2017), striving to effectively overcome cultural and linguistic differences.

### **2.2.3 Omission**

Omission in translation refers to the conscious exclusion of certain words, expressions, or cultural references from the translated text, sometimes to increase clarity and avoid misunderstandings. For example, descriptions such as "and he was wearing a leather jacket" (Dulari & Amarasinghe, 2020) provide additional context about the characters, but are sometimes omitted to simplify the text. It is considered that, although these omissions can help make a translation more concise, they can also cause important aspects that enhance the original work to be lost. In addition, specific phrases that convey cultural connotations or emotional depth, such as "Oho, the apple-oh," are excluded, resulting in a lack of cultural relevance to the target audience.

As Dulari & Amarasinghe's analysis suggests, omissions can also affect meaningful adjectives or descriptors, such as the term “gold” in “The janitor's gold braid,” which reduces the physical representation of a character. Such omissions do not necessarily change the central message but may reduce the depth of character development and place description. Moreover, Dulari & Amarasinghe established a classification of forms of omission based on Mona Baker's framework, identifying three main types: omission of words or expressions, omission of idioms, and omission of information in content. Finally, the study concludes that “the majority of omissions (53.3%) concerned words or expressions” (Dulari & Amarasinghe, 2020) aimed at improving readability and reducing redundancy, while a remarkable 44% concerned the omission of content details that contribute to a fuller understanding of the narrative. This suggests that, although omissions are often justified by the intention to improve readability, they may

unwittingly reduce the complexity of the original text, which may affect the reader's comprehension.

#### **2.2.4 Amplification.**

In translation, amplification consists of adding information that is not explicitly in the source text to improve clarity and provide context in the target text. This technique is especially useful when translating commands or imperative sentences, where details are often implied rather than directly stated. For example, Darmayanti mentions that amplification plays an important role, especially in “adding information,” which allows translators to fill in any gaps that the original text may not address. In doing so, translators ensure that the meaning and nuances of the original text are effectively conveyed to the target audience. The process of amplification is vital, especially when “detailed information does not appear in the source language” (Darmayanti, 2020), which requires the translator's precision in including the necessary context in the target language to maintain the essence of the original text.

The use of amplification helps minimize translation problems by providing explicit details that might otherwise lead to misunderstandings or ambiguities. In addition, the article points out that amplification can facilitate a smoother transition from source to target language, allowing for more natural and fluent reading. This technique reflects the translator's ability to navigate linguistic differences and cultural nuances, ensuring that the target text resonates well with readers.

#### **2.2.5 Explication.**

Explication is the process of making implicit meanings explicit in the target language. This technique is especially useful when the source text contains cultural references, idiomatic

expressions, or nuances that may not be translated directly. By employing explicitation, translators improve clarity and comprehension for the target audience, while preserving the original message. As per Pym, it is essential for translators to "determine what implicit meanings need to be clarified" (2005) to facilitate effective interpretation of the source material. Explanation has several functions, such as addressing cultural differences or simplifying complex ideas for a wide audience.

When translating a text charged with cultural context, for example, the translator may need additional explanations to convey the same emotional or conceptual impact. Pym remarks that "the success of the translation depends on the translator's ability to navigate these implicit layers" (2005), highlighting the importance of taking into account the audience's prior knowledge. Moreover, explicitness is not only about adding words but also about rephrasing or restructuring sentences to improve the clarity of the message. Furthermore, explicitation can introduce new aspects that enhance the target language version of a text. It allows for "deeper engagement with the text as readers encounter familiar contexts" (Pym, 2005). This perspective emphasizes that explicitation is not a simple stylistic technique but an act of interpretation full of details that depends on the translator's understanding of cultural and linguistic aspects.

However, translators must be careful, as over-explicitness can compromise the authenticity or intent of the original text. Therefore, striking a balance is crucial to providing readers with a faithful rendering while including necessary clarifications. In conclusion, explicitation is a vital translation tool that reveals meanings that would otherwise remain in the source text only. It requires careful attention, as "what is made explicit serves not only to clarify, but also to connect with the reader" (Pym, 2005). Ultimately, translators who master

explicitation enhance the field of translation, enabling diverse audiences to appreciate literature and cultures.

### **2.2.6 Literal Translation.**

The goal of literal translation is to reflect the source text as faithfully as possible, maintaining its structure and vocabulary while ensuring grammatical consistency in the target language. This approach prioritizes fidelity to the source text but can sometimes compromise the natural fluency and idiomatic expression of the translation. The text “Information and Entropy Measures of Rendered Literal Translation” explores the use of mathematical and linguistic measures, such as information theory and entropy, to evaluate the efficiency and quality of literal translation. These metrics help quantify the extent to which information from the original text is preserved during translation and analyze how linguistic differences influence this process.

As mentioned in the text, "literal translation involves a delicate balance between maintaining the semantic content of the source text and adapting it to the syntactic rules of the target language" (Carl, 2021). The text emphasizes that literal translation is ideal in contexts where accuracy and fidelity are crucial, such as legal, technical, or religious documents. However, it also points out its shortcomings, especially in creative or cultural texts, where a strictly literal approach may hide emotional or cultural nuances. For example, translating idiomatic expressions or culturally specific terms can be challenging, as a literal approach can lead to misunderstandings or a loss of meaning.

Carl adds that “the rigidity of literal translation can result in unnatural wording, making the translated text less accessible or relatable to the target audience” (2021). The text uses entropy measures to assess the accuracy and orderliness of the translated text compared to the

original. Lower entropy implies higher accuracy but may compromise fluency, while higher entropy suggests better adaptation to the target language, with the possibility of deviating from the original intent. Carl notes that “information and entropy measures offer a novel lens for assessing the trade-offs inherent in literal translation” (2021). In conclusion, although literal translation is crucial for fidelity, it often needs complementary methods to overcome its limitations; combining tools can improve the practice of literal translation, balancing meaning and readability. Ultimately, this study improves understanding of the dynamics of literal translation and provides a framework for its evaluation.

### **2.2.7 Punctuation changes.**

Punctuation changes in the translation are a small but influential component of the process, influencing readability, tone, and meaning. The text "Punctuation and Translation: Analyzing the Complex Interplay" argues that punctuation goes beyond simple grammar; it is a cultural resource that varies greatly from language to language. For example, French and Spanish tend to use more commas than English to indicate pauses, which can change the rhythm and emphasis of a sentence. Therefore, translators must adapt punctuation to the rules of the target language without changing the intent and flow of the original text.

As noted, “misplaced or misinterpreted punctuation can completely change the tone and even the meaning of a sentence” (Mohan, 2024), which reinforces the importance of proper punctuation. In addition, punctuation helps to express emotions and clarify relationships between ideas, which may vary according to cultural norms. While English often uses parentheses or dashes to supplement information, other languages may prefer colons or commas, requiring translators to maintain the clarity and accuracy of the target language. Mohan suggests that "Punctuation is as much about rhythm as it is about meaning" (2024), which plays a very

important role in shaping the reader's experience. In this case, translators act as intermediaries, interpreting not only the words but also the tone and intent transmitted by punctuation marks. In addition, the link between punctuation and grammar complicates translation, as changes can alter structures and force rephrasing to preserve meaning. This is crucial in legal and technical contexts, where misplaced commas can create ambiguity. Mohan mentions that "punctuation marks, like language itself, are tied to culture and convention" (2024), highlighting the need for cultural sensitivity. Therefore, careful adaptation of punctuation ensures that the target audience receives a coherent and appropriate text.

## **2.3 Glossaries.**

### **2.3.1 Relevance for the translator**

Glossaries are an important part of translation practice, as they facilitate the handling of complex terminology and bridge cultural differences. In the field of literary translation, glossaries are especially important to enhance readers' understanding and appreciation of the source material, while contributing to language acquisition. For example, the Ara Llibres series employs bilingual literary glossaries that highlight specific words, phrases, and idiomatic expressions in bold type within the original text, accompanied by their translations. This approach allows readers to relate to both the foreign language and their mother tongue. Thus, the glossaries' double functionality as tools for linguistic exploration and comprehension makes them essential for bilingual literary works aimed at language learners.

The InLector project, spearheaded by Oliver, Coll-Florit, and Climent (2012), exemplifies the adaptive application of glossaries, as it allows readers to input their knowledge of a foreign language to build customized glossaries focused on the most difficult terms in a

given text. On the other hand, existing research shows that these resources go beyond mere word lists; they are carefully crafted compilations to “help users understand the meaning of new words, especially in contexts where a foreign language is being acquired or learned” (Olivares, 2019); as a navigation aid, glossaries facilitate readers' comprehension. Medeiros (2016) offers a strong argument for the functioning of glossaries as cultural mediators, especially in the context of Portuguese literature. By including glossaries in the texts of Portuguese-speaking African writers, editors aim to unite and standardize linguistic variations between geographical regions, thus creating “the illusion that both countries share a common language” (Olivares, 2019). This strategy not only helps to understand but also reflects broad linguistic and cultural dynamics, showing how glossaries can “make a text less obscure” (Olivares, 2019), while promoting deeper connections between languages and their respective speakers.

### **2.3.2 Relevance for the translation process**

In “The Translator's Handbook” Morry Sofer discusses glossaries as essential tools for ensuring accuracy and consistency in translation. A glossary is a list of key terms and specialized vocabulary in a particular field, which allows translators to maintain consistent terminology throughout the document; Sofer explains that “a glossary is a collection of terms and their meanings that provides the translator with a quick reference for making accurate decisions. They also help translators avoid ambiguity by providing “a comprehensive list of words and their exact equivalents” (2006), which helps select the most appropriate terms. Furthermore, glossaries increase efficiency, as translators can quickly consult their glossary instead of having to repeatedly look up definitions. As Sofer points out, “the use of glossaries reduces the time spent looking up terms and helps keep the translator's attention on the meaning of the text” (2006). Glossaries also promote consistency over time by creating a reliable body of knowledge for

future work; Sofer argues that this continues to ensure consistency across multiple documents. In conclusion, glossaries are of great benefit in improving the accuracy, efficiency, and consistency of translations; they save time, promote collaboration, and are essential resources for translation projects.

### **2.3.3 How to create a glossary**

In Kirsten Malmkjær's *A Handbook for Translation Studies*, the creation of a glossary is described as a vital step in ensuring consistency and accuracy in translation. Malmkjær adds that glossaries are especially important when translating technical or specialized texts, where the use of specific terminology is indispensable. As Malmkjær says, "a glossary ensures consistency by providing translators with a reference of technical terms throughout the translation process" (2011). The process of creating a glossary begins with the identification of the most important words in the source text that are difficult to translate or that require precise definitions to avoid ambiguity.

Furthermore, Malmkjær explains that it is important to select terms that are both frequent in the text and significant to its meaning; according to her, "the creation of a glossary requires careful identification of the words that carry the central meaning of the text, especially in specialized contexts" (2011). These terms must be listed with their definitions or explanations to make sure that there is clarity and understanding. Once the key terms have been identified, the next step is to find appropriate translations or equivalents in the target language; a glossary should not only include the translation but also the necessary context or notes. Malmkjær explains that "The glossary should provide not only the equivalent in the target language but also any context necessary to understand the use of the term" (2011); this is crucial because some terms may have multiple meanings depending on the context in which they are used.

Another important aspect of glossary creation is its continuous nature; glossaries should be updated periodically to reflect new terms or adjustments to previously used terminology. Malmkjær emphasizes that "the glossary should be seen as a dynamic resource that evolves with each translation project" (2011). As the translator works with new material or continues to collaborate with a particular client or in a specific field, the glossary can be expanded over time. In summary, creating a glossary is an essential part of the translation process, especially when dealing with specialized texts; it involves identifying key terms providing accurate translations and definitions, and continually updating the glossary. In this way, translators can improve the quality of their translations.

## **Chapter III**

### **Methodological Framework**

A methodological framework is a complete guide for structuring research, providing a set of principles, strategies, and tools to ensure the coherence, validity, and clarity of the research process (Pfister et al., 2022). This framework ensures that all elements of the research process are aligned and methodologically sound, which helps the authors to obtain reliable results. In this study, the framework addresses the complex nature of translating specialized medical and holistic health texts, which requires a multi-pronged approach that combines qualitative research methods.

The research approach employed in this study integrates qualitative methods to provide a comprehensive analysis of the translation process. The decision to use qualitative methods is due to the complex nature of translation studies, in which understanding the details of translation techniques and interpreting their effectiveness play a key role. The qualitative aspect of the research delves into the interpretive aspects of translation, focusing on understanding the decisions made during the translation process.

Through the analysis of the texts, the qualitative analysis aims to determine the difficulties and strategies required to accurately convey the meanings of the specialized terminology; this part of the research is fundamental to understanding how the translator adapts the translation to the target text. In addition, the qualitative aspect provides information on the

translator's decision-making process and the factors that influence translation. This approach ensures that the study captures both the technical and practical aspects of translation, thus contributing valuable insights to the field of specialized translation studies in medical and Ayurvedic contexts.

### **3.1 Research Approach**

This research employs a qualitative method to provide a deep understanding of the subject matter and to ensure a strong analysis of the translation process. The decision to use this method is due to the specific needs and nature of translation studies, which often require interpretative understanding. The qualitative aspect of the research focuses on the interpretative nature of the translation process. Thus, this requires a detailed analysis of the grammatical and stylistic aspects of the source and target texts. Therefore, the objective is to understand the main principles and difficulties involved in the effective translation of these texts while preserving their original meaning and intent. Furthermore, by focusing on the decisions made during the translation process, the qualitative approach allows for a better understanding of the translator's decision-making process and the adaptation strategies applied to overcome linguistic differences.

### **3.2 Research Design**

The research design of this study focuses on the analysis and application of specialized translation techniques in the context of medical and holistic health texts; this approach has been chosen to address the problem presented, which evidences the need for accurate translations in the fields of holistic medicine and lipid research. Moreover, the methodology is designed to fit the objectives of the study; to ensure an analysis and application of translation techniques. The research begins with the analysis of the texts, *Lipidos*, *Lipoproteinas y Aterogenesis*, and *Perfect Health*; the analysis is carried out with the main objective of identifying the most relevant

terminological and linguistic elements of the texts. This analysis provides the most important elements to meet the specific challenges involved in the translation of specialized medical content. Qualitative content analysis is then used to identify challenges such as specialized medical terminology.

Based on the analysis, appropriate translation techniques, such as equivalence, adaptation, and explicitness, among others, are investigated and selected. Correctly selected techniques are adapted to the specific characteristics of the texts and ensure accurate translations. On the other hand, the selected translation techniques are put into practice to translate key fragments of both texts, this process involves revisions to refine the translations and ensure that they meet the standards of accuracy and consistency; this is done because attention to detail is very important in translation. Furthermore, the translations are evaluated for their effectiveness in terms of accuracy and readability. In addition, a glossary of essential terms is developed which compiles the specialized vocabulary encountered during the translation process; this glossary ensures terminological consistency and is a valuable resource for future translation work in similar fields. Data collection methods involve a combination of textual analysis and the use of translation techniques. The objective of textual analysis is the detailed examination of the source texts to identify linguistic problems that may arise during the translation process.

On the other hand, the use of translation techniques is carried out by applying specific techniques based on the requirements of the texts to ensure a well-done translation. Moreover, the study uses various tools and resources to ensure translation quality and terminological accuracy; specialized dictionaries in the fields of medicine and holistic health are used to ensure accurate and appropriate translation of specific terminology; existing glossaries related to medical tests are used; and academic journals and articles are consulted to verify the accuracy of

terminology and correct context of the texts. Also, ethical considerations are an important part of the research methodology; the study maintains academic integrity by properly citing all sources and respecting the copyright regulations of the texts used. Finally, limitations are recognized in the research, as the translation of only two texts may limit the generalizability of the results to other types of medical or holistic health content. Despite these limitations, the methodology aims to provide valuable information on the challenges and strategies of translating specialized texts in medicine and holistic health.

### **3.3 Information Sources**

In academic research, primary, secondary, and tertiary sources serve different functions in understanding and analyzing information. Primary sources are original documents or artifacts created during the period under study that provide first-hand data. For example, diaries, speeches, and creative works such as novels or music. These sources provide a direct connection to historical events or themes. For example, Anne Frank's diary offers a personal perspective on life during World War II, while Plato's Republic offers insight into ancient Greek thought (Pacion, 2024). Secondary sources, on the other hand, analyze and interpret primary sources. They include textbooks, commentaries, or reviews that provide context, criticism, or synthesis of the original materials. For example, a book analyzing the effects of World War I or a review article summarizing the results of research fall into this category (Pacion, 2024). Finally, tertiary sources summarize secondary sources to create reference materials such as encyclopedias. They provide a quick overview but lack the depth of primary or secondary sources. The sources for this study are the following:

#### **Primary sources**

- “Perfect Health” by Deepak Chopra: This book is a primary source, as it offers an original view of Ayurvedic medicine and holistic health. It is the one of basis for the translation work of this study, thus requiring detailed adaptation of concepts and terminology to ensure accuracy and cultural relevance in the target language.
- “Lípidos, Lipoproteínas y Aterogénesis”: This document represents a primary source of technical content in the field of medicine, as it contains specialized research and findings on lipid science. As an informative text, its translation implies a precise handling of terminology and the application of correct techniques to clarify complex concepts to non-expert audiences, while maintaining quality.

### **Secondary sources**

- Thesis used in the antecedents: Works used as antecedents by Navarro Morúa, Silva, Tábores, and others, explore translation techniques in different fields, such as law, social sciences, and tourism. These studies offer a complementary perspective on challenges such as maintaining formality, accuracy and cultural relevance, techniques that are also applied in translations in the fields of health and medicine. For example, Navarro Morúa's focus on cultural sensitivity fully coincides with adapting Ayurvedic health principles to a Western audience.
- References to translation theories: References to key theories such as those of Mary Snell-Hornby and Katharina Reiss, whose classification of text types and communicative purposes helps to define the approach to translation of expressive and informative texts, also mentions other theories such as those of Newmark and other translators and experts.

### **Tertiary sources**

- **Glossaries and dictionaries:** The creation of specialized glossaries, as recommended in the text *The Translator's Handbook*, ensures consistent and accurate terminology in all translations. Such glossaries are especially valuable for translating complex technical terms in fields such as lipid science and Ayurvedic health, as they help to maintain consistency and accuracy throughout the text.
- **Research methodologies from other studies:** Tools such as text analysis tables and categorization systems provide reference material; these methods facilitate the organization, consistency, and systematic evaluation of your translations, ensuring that both technical accuracy and cultural sensitivity are maintained.

### **3.4 Analysis Categories**

In this research, the categories of analysis are crucial for structuring the qualitative data, as they provide a comprehensive approach for evaluating translations of medical texts. These categories are directly related to specific research objectives and provide a solid framework for organizing and analyzing the data in an orderly fashion. Each category helps to understand different aspects of the translation process, ensuring the accuracy of the texts.

#### **3.4.1 Translation**

Translation acts as a key connection between different perspectives, enabling the transfer of knowledge from one understanding to another, either between languages, such as Spanish to English, or by simplifying complex terminology to make it more accessible. This process allows a wider audience to engage with diverse writings and viewpoints. Translation methods can vary, often giving rise to debate among specialists. The notion that "meaning can be lost in translation, but also created in translation" shows how a translator's decisions can change the original message, giving rise to new interpretations or emotions. Although translation improves access to

information across cultures, it can also result in the loss of certain aspects. Furthermore, translation can be written, which requires a careful balance between preserving the original meaning and the cultural context or spoken, where interpretation occurs in real-time (Johnson, 2020). In this study, translation refers to the process of transferring written content from one language to another while maintaining accuracy and consistency. This process is determined by specified criteria, such as terminological accuracy, grammatical accuracy, and coherence of the translated texts. In addition, the study considers the quality of the translation by taking into account the preservation of key concepts and medical terminology from the source text to the target language.

### **3.4.2 Translation procedures**

Translation procedures are the techniques used by translators on sentences and smaller linguistic units to establish equivalence between the source text and the target text. Originally described by Vinay and Darbelnet in 1958 through seven methods; borrowing, calque, literal translation, transposition, modulation, equivalence, and adaptation, these procedures have since been improved by scholars such as Lucia Molina, Amparo Hurtado, and Martí Ferriol. According to Molina and Hurtado, translation techniques provide tools for analyzing and categorizing how equivalence works and should not be confused with translation methods, which reflect the general approach to a text, nor with translation strategies, which help solve specific translation problems (soca, 2020). In this research, the corresponding translation procedures are applied to the texts to achieve accurate translations. In the translations of these texts, specific linguistic units and phrases are identified in the source texts, and appropriate techniques are applied to achieve equivalence in the target language. Moreover, the focus will be on determining how these procedures benefit the translated texts, especially in terms of accuracy and readability.

### 3.4.3 Semantic translation

Semantic translation is a method of translating texts from the source language into the target language while maintaining the original meaning as naturally as possible. This method ensures clarity and contextual accuracy by taking into account linguistic, cultural, and environmental factors. Unlike faithful translation, which strictly adheres to the grammar and structure of the source language, semantic translation prioritizes fluency and readability in the target language; it is often applied in translations of literary, technical, and formal texts, balancing accuracy with cultural nuances. However, while this method offers versatility and improves comprehension, it requires a high level of expertise and can be time-consuming (Semantic Translation: Definition, Benefits and Examples, 2024). Since the source texts contain technical language, semantic translation is relevant and is applied to ensure that the message of the texts is conveyed correctly and that semantic translation contributes to the quality of the translated texts, especially in terms of accuracy, coherence, and accessibility for the target audience.

### 3.4.4 Glossary

A glossary is a reference tool that provides definitions and explanations of key terms related to a specific field, industry, or project. It is an essential resource for translators, ensuring consistency, accuracy, and clarity in translations. By defining terminology and linguistic expressions, glossaries help translators better understand the vocabulary (Admin, 2020). Considering the specialized nature of the texts being translated. In the case of "Lipids, Lipoproteins and Atherogenesis", the glossary will include key medical and scientific terms related to lipid research and atherogenesis, ensuring that these terms are translated consistently and accurately throughout the text. Similarly, for "Perfect Health", the glossary will include

terms related to wellness and health with a focus on holistic practices, providing a reference for translators to ensure that these concepts are conveyed appropriately. The creation of the glossary will involve identifying the most important and frequently used terms in the source texts, providing their definitions, and offering appropriate translations or equivalents in the target language. By doing so, this process will not only improve the quality of the translations but will also provide a valuable resource for future translation projects related to these topics.

### **3.5 Data Collection Instruments**

Different instruments will be used in this study to collect data, each selected to fit the research objectives and provide comprehensive information on the translation of medical and holistic health texts. The selected instruments will allow for both qualitative and quantitative analysis, ensuring a balanced and accurate evaluation process.

- **Text Analysis Chart:** A text analysis chart will be used to evaluate translations systematically. This tool allows for detailing the translated texts line by line or section by section, identifying key aspects such as terminological accuracy, and translation strategies used. Each element of the text is analyzed to determine how closely the translation matches the original meaning and whether it effectively conveys technical aspects; the use of a text analysis chart is an established method in translation studies, especially when evaluating specialized texts. It therefore provides a clear and organized way to keep track of translation decisions and assesses their impact on the overall quality of the translation. According to Malmkjær (2018), text analysis charts are especially useful for identifying patterns in the way different translation strategies are applied.
- **Color-Coding table for content analysis:** Color-Coding is a well-established method for analyzing qualitative data in translation research. By applying codes, the researcher can

categorize recurring themes and strategies, which facilitates the analysis of large volumes of data (Saldaña, 2016). In this research, a color-coding table is used to classify and analyze the content of translated texts; this procedure focuses on identifying the main translation decisions, such as specific medical terminology or culturally significant terms that have been translated; the system will allow the classification of translation strategies such as borrowing, explicitation, calque or paraphrasing.

- Glossary: A glossary will be developed as a supplementary tool to facilitate readers understanding. This glossary will focus on compiling the specialized vocabulary encountered during the translation of the medical and holistic health texts; the glossary will include brief definitions and explanations where necessary, making it a useful reference for the translator and future translations in similar fields. This resource will be structured to allow easy access to key terms.

### **3.6 Collection data process and data analysis**

Data collection consists of analyzing the translated texts to assess the accuracy of the translation of medical terminology. In addition, the translated texts are compared with the originals to identify any differences or changes in meaning; this method helps to determine whether the translation accurately reflects the original content, especially in the case of complex or specialized terms. On the other hand, to support this analysis, reference is made to reliable secondary sources dealing with medical translation practices; these secondary sources, such as academic articles and textbooks, provide information on common translation techniques for technical terms, as well as a broader context for understanding the choices made in the translations studied.

The analysis is carried out through a comparative analysis, in which the original and translated texts are directly compared to assess the effectiveness of the translation. Special attention is paid to the accuracy of technical terms, the clarity of culturally adapted content, and the overall fluency of the translation; in addition, cases, where terminology has been altered or omitted to fit the context of the target language, are sought; the results of this comparison are classified into themes such as terminological consistency, and translation fidelity; these themes will be analyzed based on quality standards, such as Nida's.

### **Text Analysis**

Text Analysis	Perfect Health	Lípidos, Lipoproteínas y Aterogénesis
Text style		
Text function		
Stylistic style		
Formality		
Generality or difficulty		

Emotional tone		

### Color Coding

Transposition
Modulation
Expansion
Explication
Literal translation

## **Chapter IV**

### **Translated Texts**

#### **4.1 Translation from Spanish into English**

##### **About the author**

Carlos Carvajal Carvajal was born in 1964. He is a specialist in clinical chemistry and has developed his professional work in several institutions of the Costa Rican Social Security Fund (CCSS): Clinical Laboratory of the Palmar Sur Clinic, Clinical Laboratory of San Vicente de Paúl Hospital; Clinical Laboratory of Tony Facio Castro Hospital; Valle La Estrella Health Area Clinical Laboratory, Guápiles Hospital Clinical Laboratory; and Clinical Laboratory of Hospital Mexico, where he currently works.

He has published several articles in different journals, such as Revista Costarricense de Salud Pública and Medicina Legal de Costa Rica.

## Presentation

Heart disease remains the leading cause of morbidity and mortality worldwide.

Atherosclerosis is the underlying phenomenon driving these diseases; and behind them, there are mainly two types of lipids involved: cholesterol and triglyceride.

The present study examines the relationship between lipids and atherosclerosis, from a molecular and cellular point of view, aiming to describe and explain the various processes at the level of the molecules involved, this allows for a deeper understanding and appreciation of the remarkable complexity within the cell.

To address the different aspects related to the topic, this book is divided into four chapters:

- Chapter 1 provides the definition of lipids, their classification, and a brief overview of fatty acids, phospholipids, and cholesterol. Moreover, the various functions of lipids are discussed, emphasizing two key roles: as an energy reserve and as structural and functional components of biological membranes.
- In Chapter 2, lipoprotein metabolism is specifically discussed, that is, describing the metabolism of each one of them: chylomicrons, very low-density lipoproteins, and low-density and high-density lipoproteins. In addition, the main characteristics of these lipoproteins are briefly described. On the other hand, the strong relationship between all classes of lipoproteins is discussed in depth, as well as the subject of intracellular cholesterol regulation, which is closely related to the development of atheromatous plaque.
- In Chapter 3 the topic of atherogenesis is developed from the formation of the fatty streak until the presence of a fully formed atheroma plaque, emphasizing the

participation of the different cells involved in this process and the hemodynamic and environmental factors that influence atherosclerosis. The leading role of lipoproteins in each phase of atheroma plaque development is also highlighted.

- Chapter 4 addresses key considerations for performing, analyzing, and interpreting the traditional lipid profile. Among other aspects, the two primary methods of interpreting the information obtained from the basic lipid profile are as follows: using single values and using reason. Furthermore, the topic of the typical lipid profile present in obese, diabetic, metabolic syndrome, or insulin-resistant individuals is developed. It also discusses triglycerides, which, although not directly atherogenic, do have a significant influence on atherogenesis; specifically, the mechanisms by which triglycerides can promote atherogenesis are discussed. Finally, the topic of sampling for triglyceride determination is discussed, analyzing the question: fasting or non-fasting? For each of the alternatives, the advantages and disadvantages are cited.

In general, the content of the book allows it to be useful for both students and healthcare professionals (doctors, microbiologists, pharmacists). Through this reading, it is expected that the reader comprehends the profound biochemical complexity found within living systems.

Every day, new discoveries are made at the cellular and molecular levels, which constitute new pieces in the molecular puzzle of the human body. These findings demonstrate that in science, nothing is static, and paradigms can be discarded or modified as discoveries emerge.

The latter requires healthcare professionals to stay updated on the main topics within their field, being a difficult task given the overwhelming amount of existing information, due to the extraordinary development of science and technology. The times of classical antiquity, when it was believed that a sage possessed all the necessary knowledge of the world, are behind us.

## Chapter 1: Lipids

### Introduction

Lipids are a very heterogeneous group of organic molecules and include fats, oils, steroids, waxes, and other compounds related more to their physical properties than their chemical ones.

The term lipid refers to all compounds that share the common characteristics of being relatively insoluble in water and soluble in non-polar solvents, such as ether, chloroform, and acetone.

Mostly, lipids consist of non-polar groups (in general with a high carbon and hydrogen content), thus explaining their water-soluble characteristics. On the other hand, there are certain lipids that are more complex and contain non-lipidic groups, such as sulfates, phosphoryl, or amino.

Chemically, lipids are biomolecules that, when subjected to hydrolysis, yield fatty acids and complex alcohols that can be combined with the fatty acids, forming esters.

### Classification

According to their chemical nature, lipids can be classified into two groups or main classes. One group, which consists of open-chain compounds with polar heads or groups and long non-polar hydrocarbon tails, includes fatty acids, triacylglycerols or triglycerides, sphingolipids, phosphoacylglycerols, and glycolipids; and another group consisting of compounds with fused rings, known as steroids.

Other classification lipids are divided into:

- 1. Simple lipids:** fatty acid esters with different alcohols (fats and waxes).
- 2. Complex lipids:** fatty acid esters that contain other groups besides one alcohol and one fatty acid (phospholipids, glycolipids, and other complex lipids).
- 3. Precursor lipids and derivatives:** they include fatty acids, glycerol, steroids, ketone bodies, hydrocarbons, fat-soluble vitamins, and fat-soluble hormones.

### **Fatty Acids**

Fatty acids are simpler lipids. These are carboxylic acids with hydrocarbon chains ranging from 4 to 36 carbon in length. In some of them, the hydrocarbon chain is lineal (unbranched) and saturated (without double bonds), while in others the chain contains one or more double bonds.

In general, there is a pattern in the localization of double bonds; in most monounsaturated fatty acids these are located between carbons 9 and 10, while in polyunsaturated fatty acids are located between carbons 12 and 15. Almost all double bonds have a cis configuration.

The most frequent fatty acids have an even number of carbon atoms in one lineal chain between 12 to 24 carbons. The even number is a result of the synthesis of polyunsaturated fatty acids, made from the successive addition of units of two carbon atoms.

Regarding the physical properties of fatty acids and the compounds containing them, it should be noted that these are largely determined by the length and degree of unsaturation of the hydrocarbon chain. The non-polar hydrocarbon chains explain the poor solubility of these

compounds in the water. In the case of short-chain fatty acids, the limited solubility in water is provided by the carboxylic acid group.

In mammals, fatty acids in plasma circulate in the blood bound to albumin due to their poor solubility, and within cells, they are associated with transport proteins or stored in lipid droplets without contact with the aqueous medium.

On the other hand, like solubility, melting points are also influenced by the length and degree of unsaturation of the hydrocarbon chain. The differences in melting points among various fatty acids are due to the varying degrees of packing of these molecules. In a fully saturated compound, the molecules pack tightly with the atoms in a crystalline arrangement along the chains, establishing van der Waals contacts with the atoms of neighboring molecules. In unsaturated molecules, the cis double bond creates a bend in the hydrocarbon chain. Fatty acids with one or more bends cannot pack together as closely as saturated compounds, and their interactions with other groups are weaker. Since less thermal energy is required to disrupt this arrangement of unsaturated fatty acids, they have lower melting points than saturated compounds of the same chain length.

Another class of lipids are the so-called phospholipids, which are derived from phosphatidic acid. In general, there are two classes of phospholipids: those with glycerol as a base (phosphoglycerides) and those with sphingosine as the base molecule (sphingolipids).

Regardless of the type, all phospholipids share the characteristic of being amphipathic molecules, with a polar hydrophilic head and a long hydrophobic hydrocarbon tail. This characteristic allows the same molecule to have a water-soluble portion (the polar or hydrophilic

part) and another that is water-insoluble (the hydrophobic part). This property plays a fundamental role in the formation and stability of biological membranes.

### **Phosphoglycerides**

Phosphoglycerides constitute the main group of phospholipids; these have two fatty acids attached to the first and second carbons of glycerol and possess a charged or highly polar group attached to the third carbon (phosphate group). These compounds are named according to the polar alcohol attached to the phosphate group associated with the third carbon of glycerol. Thus, the phospholipids phosphatidylcholine and phosphatidylserine have choline and serine attached to their polar phosphate group, respectively. Among the phosphoglycerides, phosphatidylinositol and phosphatidylethanolamine can also be mentioned.

### **Sphingolipids**

Sphingolipids, instead of having glycerol, contain a long-chain amino alcohol called sphingosine. The simplest sphingolipid is ceramide, which consists of a fatty acid attached to sphingosine via an amide bond.

When a molecule of phosphoric acid and another of choline are attached to ceramide through an ester bond, sphingomyelin is formed, an important component of the myelin in nerve fibers.

### **Cholesterol**

Cholesterol is a lipid molecule found exclusively in animals and humans, although every living organism contains sterols of different types.

Cholesterol is a high molecular weight solid alcohol and has cyclopentanoperhydrophenanthrene as its base structure, a tetracyclic molecule with 17 carbons.

From this base molecule, a polar hydroxyl group and 10 carbon atoms are added, resulting in a molecule with 27 carbon atoms and a polar hydroxyl group on its carbon number 3.

## **FUNCTIONS**

### **Source of Energy**

Lipids are best known for their role as a source of energy. When fatty acids are oxidized within the cell, they release the energy necessary to carry out various biological processes: synthesis of molecules, transport of substances across membranes, and movement or mechanical work. Because fatty acids are toxic inside the cell due to their detergent effect, their cellular storage occurs in the form of triglycerides, in lipid droplets, to neutralize this effect.

Triglycerides are nonpolar molecules, insoluble in water, and chemically consist of the ester linkage of three fatty acids to glycerol. At the tissue level, the large deposit of these compounds constitutes adipose tissue, where they also serve as thermal insulation for subcutaneous tissues and around certain organs.

It is important to note that although most cells can store triglycerides, only adipocytes store them in significant amounts and make them available for use by other tissues.

As mentioned, triglycerides are stored in intracellular lipid droplets (LDs). This storage causes the expansion of adipose tissue, which occurs as an adaptive response to overnutrition, potentially preventing ectopic lipid accumulation and lipotoxicity in other tissues.

LDs also store cholesterol esters and fat-soluble vitamins. Additionally, they provide building blocks for membranes or substrates for energy metabolism and serve as organizing centers for the synthesis of specific lipids, such as triglycerides.

In general, almost all cells can synthesize LDs, the number and size of which change significantly in different cell types or between individual cells. In such a way, lots of cells have small LDs, from 100-200 nm in diameter, while LDs in adipose tissue have a diameter of up to 100  $\mu\text{m}$  and fill almost all the cytoplasm. The size of these particles can change in a short time, according to the existing conditions, during periods of lipogenesis lipid droplets grow rapidly and are reduced during periods of nutrient shortage.

Regarding their structure, LDs are formed by a monolayer of superficial phospholipids, which are derived from the endoplasmic reticulum. This monolayer surrounds a core made up of neutral lipids, primarily triglycerides and cholesterol esters, although their relative amounts vary depending on the cell type. For example, LDs in adipocytes mainly contain triglycerides, while those in macrophages contain cholesterol esters. Other hydrophobic lipids, such as fat-soluble vitamins and long-chain isoprenoids, can also be found in these organelles.

In addition to lipids, LDs have proteins on their surface. In mammalian LDs, proteins from the PAT family predominate, with the most studied members being the PLIN proteins or perilipins, as they are the main proteins associated with these particles. PLIN proteins regulate the access of lipases to the neutral lipids in the core of lipid droplets, thereby controlling lipid homeostasis. The PLIN1 protein is essential for regulating the hydrolysis of triglycerides present in LDs.

Apart from the PAT family proteins, there are other groups of proteins associated with LDs (1), with a wide range of functions: cellular signaling, energy metabolism, proteins for membrane trafficking, and chaperones, among others. Many of these are classified as 'refugee proteins,' as they do not appear to be directly relevant to the functioning of these lipid structures.

## **Hydrolysis**

The utilization of fatty acids requires their separation from glycerol through triglycerides via a hydrolysis process. This hydrolysis requires the sequential action of adipose triglyceride lipase (ATGL, from the English "adipose triglyceride lipase") to hydrolyze these compounds into diacylglycerol (DAG) and one fatty acid; hormone-sensitive lipase (HSL, from the English "hormone-sensitive lipase") to hydrolyze DAG into monoacylglycerol and another fatty acid; and the enzyme monoacylglycerol lipase to obtain glycerol and another fatty acid. This entire sequential hydrolysis process generates fatty acids and glycerol.

Under basal conditions, PLIN1 appears to reduce lipolysis by binding to the protein CGI-58, an activator of ATGL. The activation of protein kinase A (PKA) by hormonal action phosphorylates PLIN1 and releases CGI-58, allowing it to bind to ATGL. This increases the activity of ATGL on the triglycerides in the LD. Additionally, PKA phosphorylates the HSL enzyme, enabling it to bind to the LD and exert its hydrolytic action.

In the absence of PKA, HSL is mostly located in the cytoplasm. In unstimulated cells, CGI-58 is bound to PLIN1 associated with LDs and cannot exert its stimulatory activity on ATGL. Upon activation, PLIN1 is phosphorylated and releases CGI-58.

The fatty acids released through this process can follow several pathways: they can be re-esterified; used to generate energy through the process called  $\beta$ -oxidation; employed as building blocks for the synthesis of membrane lipids; serve as cofactors for cellular signaling; or be exported.

## **Biological Membranes**

Another equally important function of lipids is to be constituents of biological or plasma membranes. The basic structure of these membranes is a lipid bilayer formed by phospholipids. These molecules have an amphipathic nature, possessing a polar, hydrophilic region (the head) and a nonpolar, hydrophobic, or lipophilic region (the two tails). This characteristic allows phospholipids to interact simultaneously with both polar and nonpolar substances. Additionally, this property enables them to serve as the key molecules of cellular membranes.

In an aqueous solution, phospholipids tend to spontaneously form bilayers, with the polar region oriented outward, in contact with the aqueous phase on both sides and the nonpolar region oriented inward, forming the hydrophobic core of the bilayer and away from the water. The nonpolar regions of the lipids group together through hydrophobic interactions. These interactions are strengthened by reducing the number of water molecules surrounding the hydrophobic tail regions, achieving thermodynamic stability, and allowing the formation of lipid bilayers.

Proteins are also part of this structure; in fact, they constitute about half of the mass of the plasma membrane. Some protrude from the membrane on one side, while others protrude from both sides. Typically, the extracellular parts of lipids and proteins are often glycosylated.

The protein orientation in the bilayer is not homogeneous, creating an asymmetry; thus, the two sides or layers of the membrane are different from each other, both in composition and function. At the same time, there is another asymmetry caused by an unequal movement of electrical charges across the membrane, resulting in an electrical potential. This charge asymmetry enables several cellular processes vital to the cell. Even in the absence of ions, the asymmetric distribution of lipids in the bilayer can generate a membrane potential.

Researchers Trimble and Grinstein (2) mention various cellular mechanisms capable of generating and maintaining asymmetry in biological membranes. Among these, the following can be cited: the presence of tight junctions between adjacent cells; active transport of molecules that creates a differential concentration of components; the association of membrane proteins with cytoskeletal proteins, the endoplasmic reticulum, or extracellular matrix molecules; electrical repulsion or attraction between mobile membrane proteins; protein clusters that hinder or block the passage of mobile membrane components; the presence of microdomains within the membrane; among others.

According to their localization or interaction with the lipidic bilayer, three types of proteins are recognized:

- 1) Integral proteins, associated Integral proteins, strongly associated with the membrane by hydrophobic interactions between membrane lipids and the hydrophobic domains of the proteins.
- 2) Peripheral proteins, are weakly associated with the membrane by ionic and hydrogen bonds between the hydrophilic domains of the proteins and the polar groups of the membrane lipids.
- 3) Amphitropic proteins, found in the cytosol and in association with the membrane. The interaction of membrane proteins with lipid molecules is critical for their stability and folding.

In the case of phospholipids, four main proteins are found in the plasmatic membrane, phosphatidylcholine (PC), phosphatidylethanolamine (PE), phosphatidylserine (PS), and sphingomyelin (SM). The outer layer or leaflet of the plasma membrane consists essentially of PC and SM, while PE and PS are the predominant phospholipids in the inner layer, where a fifth phospholipid, phosphatidylinositol, is also located. In addition to these phospholipids, the

membrane contains glycolipids and cholesterol. The latter can represent up to 40% of the total lipids.

The protein-lipid ratio in cell membranes is approximately 1:40. This ratio can vary significantly depending on the cell type. Generally, metabolically active membranes are richer in proteins.

### **Flexibility and fluidity**

The different changes in the fatty acids composition of phospholipids result in changes in the physicochemical properties of the bilayer, such as flexibility and fluidity. In most cases, phospholipids have a saturated fatty acid in position 1 and an unsaturated one in position 2 of the glycerol. The double bonds in the fatty acids are in the cis configuration, causing a bend in the hydrocarbon chain. This bend prevents these acids in the membrane from packing as tightly as saturated fatty acids do, resulting in fluid and flexible aggregates or structures.

#### **Flexibility**

At a visual level, the two fatty acids of a phospholipid molecule resemble a cylindrical shape, with a surface area denominated as “A”. Unsaturation compared to saturation results in a higher A value. Replacing saturated acyl chains with cis mono- or polyunsaturated chains in a membrane model increases the area (A) by approximately 15%, which implies an increase in the distance between hydrocarbon chains. Since van der Waals attractive forces decrease as  $1/r^6$ , the increase in distance between hydrocarbon chains reduces this intermolecular attractive force between fatty acid chains, leading to greater membrane flexibility and less rigidity.

The flexibility of the membrane (determined by the unsaturation index) allows certain lipids to deform the planar structure of the bilayer through bends, altering its curvature. This enables processes such as endo/exocytosis, which are initiated by membrane bending induced by

proteins and the hydrolysis of ATP/GTP. It is worth mentioning that the plasmatic membrane can form specialized extensions with a great curvature to perform specific functions, for example, the formation of microvilli in enterocytes for efficient nutrient uptake or membrane nanotubes for intercellular communication. A closely related phenomenon is the effect of the degree of unsaturation of the bilayer on surface tension. Tight packing of the hydrocarbon chain ensures minimal exposure of the hydrophobic interior to water, resulting in positive membrane tension, which tends to contract the bilayer. The presence of cis-unsaturated fatty acids decreases tight packing and consequently reduces positive membrane tension.

### Fluidity

In general, the membrane is fluid, since most of the interactions between its components are non-covalent, allowing proteins and lipids to move laterally, in the same plane or longitudinal axis of the membrane.

Moreover, the plasmatic membrane is in continuous movement, creating a dynamic structure. At this point, it is worth noting that the term "fluidity" for biological membranes is similar to the term "viscosity" and depends on the composition of the membrane. The presence of integral membrane proteins increases the local viscosity, in its immediate vicinity, reducing the mobility of membrane constituents.

In saturated fatty acids, the linear organization of the hydrocarbon tails causes the molecules to be tightly packed in the lipid bilayer of the membrane, so there is less fluidity. In unsaturated fatty acids, there is a bending or curvature that generates a more open structure; less packed. The disordered structure caused by the presence of unsaturated fatty acids with cis

double bonds and, therefore, with bent hydrocarbon chains, makes the bilayer more fluid. In the presence of cholesterol, the order and rigidity of the membrane can be increased.

It should be kept in mind that lipid components are always in motion, to a greater degree in the more fluid bilayers and to a lesser degree in the more rigid ones. There is very little tendency for lipid molecules to migrate from one layer to another layer of the lipid bilayer, although this occasionally occurs. In contrast, lateral movement of lipid molecules within the same monolayer is frequent, especially in the more fluid layers.

With heat, the bilayers become less ordered, ordered bilayers become less ordered and those that are relatively disordered become even more disordered. This transition occurs at a characteristic temperature, being higher for membranes with higher order and stiffness, and lower for relatively fluid and disordered membranes.

### **Lipid rafts**

The hydrocarbon chains or tails of one layer interdigitate in the space of the other layer. This coupling can be reduced by cholesterol. To understand better the effect of this coupling or interdigitation phenomenon between the two layers on the properties and functions of membranes, it must be clear that membranes delimit and maintain the individuality of the cell and organelles. They also serve to store and transduce energy in the form of electrochemical gradients. In addition, they are organizing centers for functions such as metabolism and intracellular signaling and are key structures in cell biology.

The membrane is not a homogeneous or eventful structure, but rather is highly asymmetric, with different lipid and protein composition on the two sides or with organized layers, to facilitate specific cellular functions.

Sezgin and coworkers (3) point out that the small size and short in vivo half-life of these domains complicate the direct measurement of their properties in living cells. It is worth noting that the size and average life of these domains are not constant and can vary according to the circumstances of the moment.

The most obvious function of these domains is to segregate specific elements to regulate their interactions with other membrane components and their activity.

The first known signaling pathway associated with lipid rafts was signaled through immunoglobulin E (IgE).

## **4.2 Translation from English into Spanish**

### **Agradecimientos**

Deseo expresar mi más sincero agradecimiento:

A mi familia, por su profundo amor y apoyo, que es la razón de ser de todo lo que hago.

A Barney Sherman, quien fue el primero en organizar y clarificar un vasto conjunto de información en bruto; sin su paciente labor, este libro no habría visto la luz.

A dos magníficas agentes y amigas muy apreciadas: Lynn Franklin y Muriel Nellis, por hacerme creer que este proyecto tendría éxito.

A Huntley Dent, un amigo íntimo, cuyo buen juicio literario me ayudó a completar el texto.

A mi editor, Peter Guzzardi, quien insistió en la perfección y sacó lo mejor de mí.

Y a la dedicada familia de médicos, enfermeras, técnicos, instructores y personal de apoyo que realmente merecen llamar suyo el éxito del ayurveda Maharishi. Cada uno de ustedes me ha inspirado al vivir el ideal de la salud perfecta cada día. Especialmente, veo este ideal personificado en el Dr. Richard Averbach y el Dr. Stuart Rothenberg, los dos primeros médicos en este país que han hecho del ayurveda Maharishi el trabajo de su vida. Su consejo profesional en cada etapa de este libro ha sido invaluable. Gracias, queridos colegas, por abrir el camino.

### **Invitación a una realidad superior**

En cada persona existe un lugar libre de enfermedad, que nunca siente dolor, que no puede envejecer o morir. Cuando llega a este lugar, limitaciones que todos aceptamos dejan de existir. Ni siquiera son consideradas como una posibilidad.

Este lugar se conoce como Salud Perfecta.

Las visitas a este lugar pueden ser bastante breves o pueden durar por bastantes años. Sin embargo, incluso la visita más breve, inculca un profundo cambio. Mientras este ahí, las suposiciones que se mantienen como algo ordinario son cambiadas y la posibilidad de una nueva

existencia, superior y más ideal, empieza a florecer. Este libro es para personas que quieren explorar esta nueva existencia, incorporarla en sus vidas y hacerla permanente.

Con frecuencia, la causa de las enfermedades es extremadamente compleja, pero se puede afirmar una cosa con seguridad: nadie ha demostrado que enfermarse sea necesario. De hecho, es completamente lo opuesto. Todos los días entramos en contacto con millones de virus, bacterias, alérgenos y hongos; y solo la fracción más pequeña conduce a la enfermedad. No es raro para los doctores ver pacientes cuyos tractos respiratorios contienen cúmulos *de bacterias meningocócicas agudas* viviendo ahí inofensivamente. Solo en raras ocasiones brotan causando meningitis, una seria y, muchas veces, fatal infección del sistema nervioso central. ¿Qué provoca tal ataque? Nadie sabe con precisión, pero parece implicar un misterioso factor conocido como “control del anfitrión”, implicando que nosotros, como los huéspedes de los gérmenes, de alguna manera les abrimos la puerta. Más del 99.99 % del tiempo, la puerta está cerrada, lo que insinúa que cada uno de nosotros está más cerca de la salud perfecta de lo que nos damos cuenta.

La mayor causa de muerte en los Estados Unidos son las enfermedades cardíacas, las cuales, en muchas ocasiones, son causadas por depósitos de placa bloqueando las arterias coronarias que llevan oxígeno al corazón. Cuando el colesterol y otros restos comienzan a obstruir estas arterias, la falta de oxígeno amenaza con dañar la función del corazón. Pese a ello, la evolución a enfermedades cardíacas es altamente personal. Una persona con un único trozo de placa bastante pequeño puede quedar incapacitada por una angina, el dolor de pecho asfixiante sintomático de la enfermedad arterial coronaria. Una segunda persona con varios depósitos de placa lo suficientemente grandes para bloquear la mayoría del flujo de oxígeno al corazón podría no sentir nada. Personas cuyas arterias coronarias fueron bloqueadas en un 85 % han sido conocidas por correr maratones, mientras que otros han muerto de un ataque al corazón con los vasos

completamente limpios. Nuestra habilidad física para repeler enfermedades es extremadamente flexible.

Además de la inmunidad física de nuestro cuerpo, todos tenemos una fuerte resistencia emocional a la enfermedad. Como una antigua paciente mía dijo: “He leído suficiente psicología para saber que se supone que un adulto equilibrado se reconcilia con enfermarse, envejecer y, eventualmente, morir. En algún punto he entendido eso, pero emocional e instintivamente, no lo creo en absoluto. Enfermarse y deteriorarse físicamente parece como error espantoso y siempre he esperado que alguien viniera a corregirlo”.

Actualmente, esta mujer tiene casi 70 años, y su condición física y mental es excelente. Cuando se le preguntó qué esperaba, ella dijo: “Pensarás que esto es una locura, pero mi actitud es que no voy a envejecer, que no voy a morir”. ¿Es eso tan disparatado? Las personas que consideran que están “muy ocupadas para enfermarse” son conocidas por tener una salud superior a la media, mientras que los que se preocupan excesivamente por enfermedades son presa de ellas con más frecuencia. Otro hombre nos dijo que la idea de la salud perfecta le atrajo porque era una solución creativa, si no la única solución, a los abrumadores problemas que enfrenta la medicina actualmente. Un ejecutivo electrónico con mucho éxito, este hombre comparó la salud perfecta al tipo de “pensamiento innovador” que transforma corporaciones.

El pensamiento innovador es una forma única de resolución de problemas; implica hacer una mejor situación elevando sus expectativas mucho más alto de lo que alguien creería posible y después buscar maneras de cómo hacer que su visión se haga realidad. “Si las personas continúan pensando y actuando de las mismas maneras de siempre”, este hombre comentó, “ellas podrían lograr entre un 5 y un 10 % de mejoras trabajando más duro. Sin embargo, para tener mejoras de

2 a 10 veces, los objetivos deben estar lo suficientemente altos para que la gente diga: ¡Bueno, si quieres mejorar tanto, debemos hacer esto de una forma totalmente diferente!”.

El pensamiento innovador ha sido aplicado entre empresas informáticas avanzadas de Silicon Valley, por ejemplo, si el modelo actual de hardware o software toma 48 meses en desarrollarse, la siguiente generación estará programada por 24 meses. Si los defectos en manufactura han sido reducidos en un 5 %, entonces, tener “cero defectos” se convierte en la norma para el futuro. Así es exactamente como la salud perfecta funciona, establece como objetivo tener cero defectos y luego cómo alcanzar ese objetivo. En el mundo informático, puede llegar a costar de 8 a 10 veces más reparar una máquina defectuosa que hacerla sin defectos desde un principio. Por esa razón, imponer: “calidad desde el origen” (es decir, hacer las cosas bien desde el principio) tiene más sentido comercial que optar por tecnología meramente lo “suficientemente buena”.

Lo mismo aplica en medicina, donde la prevención es mucho más barata que el tratamiento, en ambos términos, humanos y económicos. Una encuesta hecha en 1988 muestra que, más que cualquier otra cosa, los estadounidenses le temen a enfermedades graves. La razón no tiene nada que ver con el dolor y el sufrimiento, sino que involucra los gastos abrumadores de largas estadías en hospitales y los masivos costos de cualquier cirugía y medicamentos que sean requeridos. Ni siquiera la muerte da tanto miedo como ver a su familia caer en la miseria. Está claro que necesitamos un enfoque médico que crea en la “calidad desde el origen” y lo promueva en las personas.

### **Promesa de una nueva medicina- *ayurveda Maharishi***

El primer secreto de la salud perfecta que debe saber es que tiene que elegirla, solo puede ser tan saludable como crea que es posible. La salud perfecta no se trata simplemente de una mejora del

5 o 10 % sobre la buena salud, implica un cambio total de perspectiva, que considere la enfermedad y una vejez enfermiza como algo inaceptable.

¿Realmente podemos creer en que tener “cero defectos” en algo tan complejo como el cuerpo humano? De acuerdo con el Instituto Nacional sobre el Envejecimiento, ninguna dieta, ejercicio, vitamina, fármaco o cambio de estilo de vida ha demostrado ser capaz de prolongar la vida de manera fiable. Evitar los problemas degenerativos que afectan a los mayores — problemas cardiacos, accidentes cerebrovasculares, cáncer, arteriosclerosis, artritis, diabetes, osteoporosis, etc.— es más posible que nunca, pero aún improbable. Aunque los investigadores médicos del sector público hablan con optimismo sobre los avances significativos en la cura del cáncer y otras enfermedades graves intratables, entre ellos son mucho más pesimistas. Lo mejor que pueden esperar es un progreso gradual, tomar un pequeño paso a la vez hacia una solución (por ejemplo, bajar los niveles de colesterol reducirá, estadísticamente, los ataques al corazón en un grupo grande de personas, pero no garantiza que cada persona se salvará).

Para hacer que la salud sea el doble o 10 veces mejor, debes tener un nuevo tipo de conocimiento, basado en un concepto más profundo de la vida. Este libro presenta una fuente única de dicho conocimiento, un sistema de medicina preventiva y el cuidado de la salud llamado ayurveda Maharishi. Desarrollada en la India hace más de 5000 años, la palabra ayurveda proviene de dos términos del sánscrito: *Ayur* o “vida” y *Veda* que significa “conocimiento” o “ciencia”. Por lo tanto, ayurveda suele traducirse como “la ciencia de la vida”; una interpretación más precisa sería: “el conocimiento del tiempo de vida”.

El propósito del ayurveda es decirnos cómo nuestras vidas pueden ser influenciadas, formadas, prolongadas y, finalmente, controladas sin la interferencia de enfermedades o edades avanzadas. El principio básico del ayurveda es que la mente ejerce la mayor influencia en el

cuerpo y la liberación de las enfermedades depende de estar en contacto con nuestra conciencia, alcanzar un equilibrio y luego extender ese balance hacia el cuerpo. Este estado de conciencia en equilibrio, más que cualquier tipo de inmunidad física, crea un mejor estado de salud.

El ayurveda encarna la sabiduría de los sabios que comenzaron su tradición muchos siglos antes de la construcción de las pirámides y lo han llevado adelante generación tras generación. Un sistema modernizado basado en sus perspectivas, ayurveda Maharishi, no llegó al Occidente hasta 1985. Recibe su nombre de Maharishi Mahesh Yogi, el fundador de la *meditación trascendental*, quien puso su atención en traer de vuelta el ayurveda a principios de 1980. Fui afortunado de ser uno de los primeros médicos en ofrecer esta nueva medicina; he atendido a más de 10 000 pacientes con ella en los últimos 5 años y he entrenado a casi otros 100 médicos en la teoría y práctica ayurvédica. Al adoptar el ayurveda Maharishi, no he abandonado mi formación convencional inicial, más bien la he ampliado. Combinar el ayurveda Maharishi con la medicina occidental une la sabiduría antigua con la ciencia moderna y las dos han demostrado ser completamente compatibles. Como doctor, sigo haciendo historiales médicos y exámenes físicos a mis pacientes, apoyándome en pruebas objetivas que me digan si una persona está enferma. Sin embargo, también me dedico a orientar a mis pacientes para que miren hacia dentro, para que encuentren esa conciencia equilibrada tan importante dentro de sí mismos.

### **El cuerpo humano mecánico cuántico**

Para entender cómo esto es posible, tenemos que profundizar dentro del propio cuerpo. En el ayurveda, el cuerpo físico es la entrada a lo que yo llamo el “cuerpo humano mecánico cuántico”; los físicos nos informan que el elemento básico de la naturaleza se encuentra a un nivel cuántico, más allá de los *átomos* y las *moléculas*. Un cuanto, conocido como la unidad

básica de la materia o la energía, es 10.000.000 a 100.000.000 de veces más pequeño que el átomo más pequeño. A este nivel, la materia y la energía se hacen intercambiables. Todos los *cuantos* están hechos de vibraciones invisibles —fantasmas de la energía— esperando a tomar una forma física. El ayurveda dice que lo mismo ocurre en el cuerpo humano, primero toma forma como invisible, pero son intensas vibraciones, llamadas fluctuaciones cuánticas, antes de fusionarse en impulsos de energía y partículas de materia.

El cuerpo humano mecánico cuántico es la base de todo lo que somos: pensamientos, emociones, proteínas, células, órganos, cualquier parte de nosotros, visible o no. A nivel cuántico, su cuerpo envía todo tipo de señales invisibles, esperando a que las capte. Tiene un pulso cuántico bajo su físico y un corazón cuántico latiendo. De hecho, el ayurveda Maharishi sostiene que todos los órganos y procesos en el cuerpo tienen un equivalente cuántico.

El cuerpo humano mecánico cuántico nos beneficiaría muy poco si no pudiéramos detectarlo. Afortunadamente, la conciencia humana es capaz de sentir estas débiles vibraciones, gracias a la increíble sensibilidad de nuestro sistema nervioso. Un solo fotón de luz cayendo en la retina del ojo tiene mucho menos impacto que una sola partícula de polvo cayendo en un campo de fútbol. Sin embargo, las terminaciones nerviosas especializadas de la retina, los bastones y los conos pueden realmente detectar un solo fotón, enviar el mensaje al cerebro y hacer que vea su luz. Los bastones y conos son como *radiotelescopios* gigantes, enormes estructuras que aún pueden recoger señales en el propio límite de la existencia física, y después aumentarlas de tal manera que nuestros sentidos pueden lidiar con ellos de manera directa.

Al tratar el propio cuerpo mecánico interno, el ayurveda Maharishi puede provocar cambios que van mucho más allá del alcance de la medicina convencional, que está limitada al ámbito de la fisiología general. Esto se debe a que el poder disponible a nivel cuántico es infinitamente mayor

que el de los niveles más bajos; como, por ejemplo, la explosión de una bomba atómica, un evento atómico gigantesco. Un ejemplo más constructivo es el láser, el cual toma la misma luz que es emitida por una linterna y, al organizarla en vibraciones cuánticas coordinadas, aumenta su potencia lo suficiente como para atravesar el acero.

Aquí actúa el principio cuántico, que revela que los niveles más sutiles de la naturaleza contienen el máximo potencial de energía. El vacío oscuro del espacio intergaláctico, aunque es un mero vacío, contiene casi inconcebibles cantidades ocultas de energía, suficiente en cada metro cúbico para alimentar a una estrella. Solo cuando da el salto cuántico, esta «energía virtual», como se le denomina, estalla en calor, luz y otras formas de radiación visible.

Todos sabemos que quemar un pedazo de madera libera mucha menos energía que separar sus átomos por medio de una reacción nuclear. Pero hemos ignorado la parte creativa de la misma ecuación, hacer algo nuevo a nivel cuántico sería igual de potente que destruirlo. Solo la naturaleza crea rocas, árboles, estrellas y galaxias; pero cada día nos dedicamos a fabricar algo mucho más complejo y valioso que una estrella: un cuerpo humano. Nos demos cuenta o no, somos responsables de crear el cuerpo en el que vivimos. En el invierno de 1988, se crearon titulares cuando un cardiólogo de San Francisco, el Dr. Dean Ornish, demostró que 40 pacientes con cardiopatías avanzadas realmente podían reducir los depósitos de placa grasosa que obstruían progresivamente sus arterias coronarias. Ya que las arterias de estos pacientes comenzaron a abrirse, el aire fresco empezó a llegar a sus corazones, por lo tanto, aliviando sus aterradores dolores de pecho y reduciendo los riesgos de tener problemas cardiacos mortales.

En vez de depender de medicinas convencionales o cirugías para desbloquear esas arterias, el grupo del doctor Ornish utilizó ejercicios simples de yoga, meditación y una estricta dieta baja en colesterol. ¿Por qué este descubrimiento se consideró tan destacable? Porque la medicina

convencional nunca había reconocido que las enfermedades cardíacas pueden ser revertidas una vez que se han desarrollado. La postura oficial de la medicina sostiene que una arteria enferma sigue su propio curso. No importa lo que creas, pienses, comas o hagas, esas arterias persiguen sin descanso su fatal destino y, eventualmente, se bloquean y estrangulan los músculos del corazón.

Sin embargo, a nivel cuántico, ninguna parte del cuerpo vive aparte del resto. No hay hilos uniendo las moléculas de tus arterias, así como no hay conexiones visibles uniendo las estrellas en una galaxia. Aun así, las arterias y las galaxias están firmemente unidas, en un impecable y perfecto diseño. Los vínculos invisibles que no puedes examinar bajo un microscopio son de naturaleza cuántica, sin esta “fisiología oculta”, tu fisiología visible no podría existir. Nunca hubiera sido más que una recopilación aleatoria de moléculas.

El ayurveda Maharishi hubiera dicho que el descubrimiento de Ornish sobre las enfermedades cardíacas es verdad para cualquier enfermedad, una vez que sabe hacer uso del cuerpo mecánico cuántico. Un depósito de placa lleno de colesterol se ve sólido, como el óxido que recubre una vieja tubería, pero la placa está viva y cambiando, como el resto del cuerpo. Nuevas moléculas de grasa entran y salen de ella, se desarrollan nuevos capilares para aportar oxígeno y alimentos. Las verdaderas revelaciones del estudio de Ornish son que aquello que creamos también podemos revertirlo. Un hombre que muere de un ataque al corazón a la edad de 50 años ha tenido innumerables oportunidades de desarrollar arterias nuevas. Una mujer de 70 años que desarrolla osteoporosis en su columna vertebral ha tenido innumerables oportunidades de desarrollar una columna vertebral sana (realmente no podemos contar las oportunidades; sin embargo, puede sanar una arteria dañada o un hueso defectuoso en cuestión de una semanas o

meses). Todos estamos construyendo nuevos cuerpos todo el tiempo, ¿por qué no construir una arteria sana, una columna vertebral sana, una persona completamente sana?

En la antigua tradición védica de la India, la fuerza más básica que yace en toda la naturaleza es la inteligencia. Después de todo, el universo no es solo una “sopa de energía”, no es solamente caos. El asombroso equilibrio de las cosas en nuestro mundo y, sobre todo, la asombrosa existencia del ADN, sustenta a favor de una cantidad infinita de inteligencia en la naturaleza. Como dijo un astrofísico, la probabilidad de que la vida se haya originado por azar es tan baja como la de un huracán que atraviesa un depósito de chatarra y ensambla un *Boeing 707*.

Uno de los cambios más importantes en la ciencia moderna es la aparición repentina de modelos que consideran la inteligencia como una fuerza vital del universo (en física, por ejemplo, existe el llamado principio antrópico, que propone que toda la creación desde el Big Bang fue diseñada explícitamente para propiciar la existencia del hombre).

¿Por qué esto es relevante para nosotros? Porque el ayurveda Maharishi, visto en su contexto más amplio, no es menos que una tecnología para contactar el nivel cuántico dentro de nosotros. Para llegar ahí, necesitas técnicas especiales, las cuales abordaremos en detalle, que te permitan quitar la máscara del cuerpo físico; además, debes trascender o ir más allá de la constante actividad que ocupa la mente, como el ruido de una radio que no se puede apagar. Más allá de esa distracción, hay una región silenciosa que parece igual de vacía que un campo cuántico entre las estrellas. Sin embargo, al igual que el campo cuántico, nuestro silencio interior es muy prometedor.

El silencio dentro de nosotros es la clave para el cuerpo mecánico cuántico. No es un lugar caótico, sino organizado. Tiene forma y diseño, propósito y procesos, igual que el cuerpo físico.

En vez de ver a su cuerpo como un conjunto de células, tejidos y órganos, puede usar la perspectiva cuántica para verlo como un flujo silencioso de inteligencia, un burbujeo constante de impulsos que crean, controlan y se convierten en su cuerpo físico. El secreto de la vida a este nivel es que cualquier cosa en su cuerpo puede ser cambiada con el simple impulso de una intención.

Puede que resulte difícil de creer, permítanme ofrecer el ejemplo de Timmy, un niño de 6 años, aparentemente normal, que padece uno de los síndromes psiquiátricos más extraños: trastorno de personalidad múltiple, cada una con sus propios patrones emocionales, inflexiones vocales, gustos y aversiones. Aun así, las personas con múltiples personalidades no son meros casos psicológicos; ya que, a medida que abandonan una personalidad y asumen otra, pueden manifestarse cambios notables en sus cuerpos.

Una personalidad podría tener diabetes, por ejemplo, y la persona tendrá deficiencia de insulina, mientras esa personalidad esté activa. Y aun así, las otras personalidades pueden estar completamente libres de tener diabetes, con niveles de insulina dentro del rango normal.

Igualmente, una personalidad podría tener presión arterial alta, mientras las otras no; incluso cicatrices, verrugas, heridas. Incluso, se ha observado la aparición y desaparición de imperfecciones en la piel con el cambio de personalidades. Los estudios sobre múltiples personalidades incluyen pacientes capaces de alterar instantáneamente sus ondas cerebrales en un *EEG* o cambiar el color de sus ojos de azul a café. Una mujer experimentaba tres ciclos menstruales distintos cada mes, cada uno correspondía a una de sus tres personalidades distintas.

Timmy es especialmente sorprendente, ya que solamente una de sus personalidades es alérgica al jugo de naranja y desarrolla un sarpullido si lo llega a consumir. Daniel Goleman, escritor sobre salud, declara en el *New York Times*: “El sarpullido aparecerá de igual manera, incluso si

Timmy bebe jugo de naranja y, mientras se está digiriendo, otra personalidad toma el control. Además, si Timmy regresa mientras la reacción alérgica está en curso, la picazón del sarpullido cesará de inmediato y las ampollas llenas de agua empezarán a desaparecer”.

Este es un perfecto ejemplo de cómo las señales del cuerpo mecánico cuántico pueden generar cambios inmediatos en el cuerpo físico. Lo que es destacable aquí es que las alergias no suelen ir y venir a voluntad de la mente. ¿Cómo podrían? Los glóbulos blancos del sistema inmune, recubiertos de anticuerpos que provocan la reacción alérgica, esperan pasivamente el contacto de un antígeno; cuando ocurre el contacto, una serie de reacciones químicas se desencadenan automáticamente.

Sin embargo, en el caso de Timmy, parece que, cuando las moléculas de jugo de naranja se acercan a sus glóbulos blancos, toman la decisión sobre si reaccionar o no. Esto implica que la propia célula es inteligente. Por otra parte, su inteligencia está contenida en un nivel más profundo que sus moléculas, ya que el anticuerpo y el jugo de naranja se componen de átomos muy ordinarios de carbono, hidrógeno y oxígeno.

Decir que las moléculas pueden tomar decisiones desafía la ciencia física actual, es como si el azúcar a veces tuviera la sensación de ser dulce y a veces no. Pero no es solo la notable intensidad del caso de Timmy lo que nos aturde. Una vez que asimilamos el hecho de que él ha elegido ser alérgico; porque, si no, cómo iba a activar y desactivar su sarpullido; nos enfrentamos a la posibilidad de que nosotros también estemos eligiendo nuestras propias enfermedades. No somos conscientes de esta elección, porque tiene lugar a un nivel por debajo de nuestros pensamientos cotidianos. Pero, si tuviéramos esa capacidad, deberíamos poder controlarla.

## **El cuerpo es un río**

Tendemos a percibir nuestros cuerpos como “esculturas congeladas”, objetos sólidos, fijos y materiales, cuando en realidad se asemejan más a ríos en constante cambio, manifestaciones dinámicas del flujo de la inteligencia. El filósofo griego Heráclito declaró: “No puedes andar por el mismo río dos veces, porque siempre fluyen aguas frescas en él”. Lo mismo pasa con el cuerpo; si se pellizca un poco alrededor de la cintura, la grasa que aprieta entre los dedos no es la misma que la del mes pasado. Su tejido adiposo (células de grasa) se llena de grasa y se vacía constantemente, de modo que se renueva en su totalidad cada 3 semanas. El revestimiento del estómago se renueva cada 5 días (la capa más interna de células estomacales se reemplaza en cuestión de minutos al digerir los alimentos). La piel se renueva cada 5 semanas. El esqueleto, aparentemente tan sólido y rígido, se renueva por completo cada 3 meses. En total, el flujo de oxígeno, carbono, hidrógeno y nitrógeno es tan rápido que usted podría ser renovado en cuestión de semanas; solo los átomos más pesados de hierro, magnesio, cobre, etc., ralentizan el proceso. Aunque exteriormente parezcas el mismo, eres como un edificio, cuyos ladrillos se sustituyen constantemente por otros nuevos. Cada año se sustituye el 98% del número total de átomos de tu cuerpo, según han confirmado los estudios radio isotópicos de los laboratorios Oak Ridge de California. Este flujo constante de cambio está controlado a nivel cuántico por el sistema mente-cuerpo y, sin embargo, la medicina no se ha aprovechado de este hecho, sigue esperando dar el salto cuántico.

Para cambiar la impresión del cuerpo, hay que aprender a reescribir el *software* de la mente. En los siguientes capítulos, me gustaría llevarle a un viaje de autoexploración. Voy a mostrar cómo el ayurveda Maharishi puede ponerle en un mejor control de su salud desde este nivel cuántico que es la próxima frontera de la medicina. El enfoque se divide en tres partes, divisiones correspondientes de este libro.

## **Parte I: Un lugar llamado salud perfecta**

Primero exploramos la posibilidad de una salud perfecta y luego abordamos las cuestiones prácticas. El ayurveda Maharishi nos enseña que a cada persona se le ha dado un destino único diseñado por la naturaleza; esto se conoce como su *prakriti* o tipo de cuerpo. Al responder un sencillo cuestionario en el capítulo 2, descubrirá cuál de los 10 tipos básicos de cuerpo se aplica a usted. Este es el paso más importante para mejorar su salud, ya que su *prakriti* revela cómo la naturaleza ha diseñado su forma de vivir. De acuerdo con el ayurveda, su cuerpo sabe lo que es bueno y malo para él, la naturaleza le ha inculcado los instintos necesarios desde su nacimiento. Una vez que comience a notar y obedecer estas tendencias innatas, descubrirá que su fisiología es capaz de alcanzar el equilibrio por sí sola, con un esfuerzo mínimo por su parte.

A medida que exploramos, incluso los pequeños desequilibrios en su cuerpo pueden sembrar las semillas de futuras enfermedades, mientras que mantener el equilibrio puede garantizar un estado de salud óptimo. Se exponen los puntos fuertes y débiles de cada tipo de cuerpo, lo que le permitirá elegir su propio enfoque específico para la prevención de enfermedades. La enfermedad que hay que evitar es aquella a la que se es más propenso y que viene indicada por su *prakriti*.

## **Parte II: El cuerpo humano mecánico cuántico**

En esta sección, exploramos en mayor profundidad el nivel cuántico dentro de nosotros, analizando cómo la mente influye en el cuerpo y lo guía tanto hacia la enfermedad como hacia la salud. Cientos de años antes de que la medicina moderna descubriera la conexión mente-cuerpo, los sabios del ayurveda ya la habían comprendido y dominado. Ellos desarrollaron una "tecnología interna" que actúa desde los niveles más profundos de nuestra conciencia. El secreto

de la salud perfecta recae en la práctica de estas técnicas. Analizamos el papel de la meditación en la eliminación de los obstáculos para la salud; explorando cómo el cuerpo humano mecánico cuántico puede aprovecharse para transformar el cuerpo físico de manera mucho más poderosa que cualquier medicamento, dieta o ejercicio.

En esta sección abarcamos muchos temas, desde las adicciones al cáncer a la eliminación de toxinas físicas y mentales, todas las áreas de la medicina que son tratadas en una clínica de ayurveda Maharishi. Viéndose a usted mismo desde la perspectiva de un doctor ayurvédico y leyendo casos de estudio de personas que han pasado por nuestros programas, comprenderá mejor por qué la «curación cuántica» representa un gran avance en nuestro enfoque de la mente y el cuerpo.

### **Parte III: Vivir en sintonía con la naturaleza**

Después de presentar el grandioso diseño del ayurveda Maharishi, concluyo con los consejos prácticos que he recogido en los últimos 5 años. El ideal de la salud perfecta depende de un perfecto equilibrio. Cada cosa que se come, dice, piensa, hace, ve y siente afecta su estado general de equilibrio. Parece un desafío controlar todas estas influencias diferentes al mismo tiempo. Aun así, al seguir dietas específicas de acuerdo con su tipo de cuerpo, ejercicios, y rutinas diarias y estacionales, puede corregir la mayoría de los desequilibrios presentes actualmente en su fisiología y prevenir los que pueda haber en el futuro.

#### **El encantamiento de la naturaleza**

Es fascinante ver cómo la salud perfecta coincide en un movimiento intelectual más amplio que está sacudiendo los cimientos de la ciencia. Ilya Prigogine, ganador del Premio Nobel de Química en 1977 y pionero de este movimiento, lo llama “el encantamiento de la

naturaleza”, la comprensión de que la naturaleza no es una máquina, sino un entorno maravilloso cuyas posibilidades ocultas apenas se adivinan hoy en día. La naturaleza es como una cadena de radio con infinitas emisoras, la realidad que está experimentando ahora es solo una emisora de la radio, completamente convincente mientras permanezca sintonizado a ella, pero enmascarando las otras opciones que se encuentran a ambos lados.

A finales del siglo, el psicólogo William James insinuó el mecanismo que nos permite girar el mando: “uno de los mayores descubrimientos de mi generación”, escribió, “fue que los seres humanos pueden cambiar sus vidas modificando sus mentalidades”. Esta fue una observación muy previsor, dirigida más al futuro que a la época de James. En su época era indiscutible que la naturaleza se desarrollaba mecánicamente, fruto de leyes inflexibles que operaban sin tener en cuenta a los seres humanos. Ahora parece que, en realidad, los seres humanos pueden contar mucho: quizá la naturaleza solo nos da la realidad que esperamos y en la que creemos.

Ciertamente, hemos pasado muchos siglos creyendo en la enfermedad y en la muerte. Esto dice mucho más de nuestra relación con la vida que de la vida misma. La vida es inmensamente flexible y las fuerzas que hacen que perdure son, al menos, tan fuertes como las que hacen que decaiga. Si se planta un pino silvestre en un terreno urbano de una ciudad contaminada, puede vivir 50 años; plantado en el campo, su esperanza de vida puede aumentar a 200 o 300 años; en las crestas azotadas por el viento de las Montañas Rocosas, puede sobrevivir más de 2000 años. ¿Cuál es su esperanza de vida natural? Depende totalmente de la situación. Siempre hay fuerzas que actúan a favor de la vida del pino y otras que se oponen a ella. En ese equilibrio dinámico reside el destino del árbol. Tanto una vida relativamente corta como una inmensamente larga son naturales, dependiendo del entorno.

Un ratón de laboratorio suele vivir menos de 2 años criado en una jaula con una dieta normal. Si se reduce su temperatura corporal y se le alimenta con una cantidad mínima de calorías (conservando las vitaminas, minerales, proteínas, etc. que necesita), la vida del ratón puede prolongarse el doble o incluso el triple. Por otro lado, si se expone al mismo ratón a un estrés anormal, como echarlo todos los días delante de un gato que se mantiene justo fuera de su alcance, es muy probable que el ratón muera en cuestión de semanas. En todos los casos, los órganos internos del ratón habrán envejecido en el mismo grado: el corazón, el hígado y los riñones estarán uniformemente «viejos», aunque el ratón más viejo haya vivido quizá 50 veces más que el más joven.

A medida que cambia el equilibrio de fuerzas, cambia la vida. En el caso de los seres humanos, el entorno puede elegirse y controlarse, lo que da a nuestra propia vida una enorme flexibilidad. Cuando hablamos de salud perfecta, estamos proponiendo que el equilibrio dinámico de la vida puede inclinarse a nuestro favor. Nadie ha vivido eternamente, pero se pueden añadir 50 años a una media de vida moderna de 70 años y alcanzar la mayor longevidad registrada (121 años, atribuidos a un isleño japonés de alta mar). En el Imperio romano, la esperanza de vida de un adulto era de 28 años; en el año 2000 puede llegar a 90 años para un estadounidense sano, hombre o mujer. Esto representa una gran flexibilidad.

Si nos fijamos en la unidad más pequeña de la vida, la célula, la discrepancia entre una vida larga y una corta es aún más pronunciada. Tome un cubo de agua de la orilla de un estanque; cuando ponga una gota bajo el microscopio, estará repleta de plantas y animales unicelulares: paramecios, amebas, algas, etc. Cada ameba puede tener una vida de solo 2 o 3 semanas. Pero, como las amebas se multiplican por división, el material genético de cada ameba es tan antiguo como la célula madre de la que procede, lo que hace que tenga 4 semanas de vida

en lugar de 2. La célula madre desciende de su propia matriz, por lo que tendríamos que decir que parte de la ameba que estamos viendo es 3 veces más vieja de lo que pensábamos, otra parte 4 veces más vieja, hasta llegar a la conclusión de que, en realidad, esta única ameba de nuestro estanque local es tan vieja como todas las amebas que han existido, quizá 1000 millones de años.

Los átomos y moléculas del interior de la ameba no han habitado en ella durante tanto tiempo. Van y vienen constantemente, en un remolino de oxígeno, hidrógeno, carbono y nitrógeno. Sin embargo, la ameba conserva su forma e identidad a lo largo de las generaciones. Una fuerza vital la mantiene cohesionada, siempre que su ADN permanezca intacto, esta célula albergará su esencia vital para siempre.

Su cuerpo está formado por, aproximadamente, entre 50 y 100 billones de células; su cuerpo, aunque inconcebiblemente más complejo que una ameba, alberga una vida que es igual de antigua e igual de joven al mismo tiempo. Para hablar con precisión sobre la esperanza de vida humana, se debe contemplar los muchos periodos de vida representados dentro de un cuerpo. Una célula típica del revestimiento del estómago solo vive unos días y una célula típica de la piel solo 2 semanas; un glóbulo rojo vive más, 2 o 3 meses. Las células más longevas se encuentran en el hígado, donde tardan varios años en reemplazarse; las del corazón y el cerebro parecen durar toda la vida sin reproducirse. Lo asombroso es que exactamente el mismo ADN controla todos los periodos de vida, desde el más corto hasta el más largo. Las células de la piel y las del cerebro son genéticamente idénticas; descienden desde el momento de la concepción, cuando la mitad del ADN de su padre se fusionó con la mitad del de su madre para formar la cadena única de ADN que se convierte en usted. Mediante un proceso que aún no entendemos, su ADN fue capaz de crear todos estos tipos de células especializadas, cerebro, piel, corazón, hígado, etc. Cada una con su propia vida útil. No se puede saber qué vida será larga o corta con

solo mirar la célula, las neuronas del cerebro, que duran toda la vida, son prácticamente idénticas a las células olfativas de la nariz, que nos proporcionan el sentido del olfato, pero las células del olfato se sustituyen cada 4 semanas.

Al igual que la ameba, cada célula humana está formada por átomos que vuelan literalmente a través de ella: solo se tardan unas milésimas de segundo en intercambiar oxígeno y dióxido de carbono en los pulmones; los iones de sodio y potasio entran y salen de las células cerebrales 300 veces por segundo. El músculo cardíaco extrae el oxígeno de la hemoglobina de la sangre con tanta rapidez que, en pocos segundos, la sangre que alimenta el corazón a través de las arterias coronarias, de color rojo vivo, sale casi negra.

Pero este remolino interminable de actividad no disuelve su forma o identidad, como tampoco lo hace con la de la ameba. Su ADN es claramente humano desde hace al menos 2 millones de años; el ADN original del que desciende es tan antiguo como la vida misma, casi 2000 millones de años. Usted es extremadamente permanente a nivel genético, aunque el material de su cuerpo va y viene.

### **Una vida sin imperfecciones**

Si la vida puede ser tan flexible y dinámica, lo sorprendente es que no duremos más tiempo. Y lo haríamos, si supiéramos manejar el equilibrio de fuerzas que actúan en nosotros y a nuestro alrededor. Los antiguos sabios del ayurveda se atrevieron a plantear la pregunta definitiva: ¿debemos enfermar y envejecer? Su respuesta fue negativa. Si las fuerzas de nuestro interior se mantienen en armonía y en equilibrio con el entorno que nos rodea, podemos ser inmunes a la enfermedad. El equilibrio perfecto hace posible la salud perfecta.

En el ayurveda Maharishi, nos basamos en el principio básico de que cualquier trastorno puede prevenirse, siempre que se mantenga el equilibrio, no solo en el cuerpo, sino también en la mente y el espíritu. Los sabios del ayurveda enseñan que hay un impulso en todos nosotros para crecer y progresar. Este impulso gobierna nuestro equilibrio general automáticamente, se puede ver en funcionamiento en cada célula, pero particularmente en el cerebro, que equilibra simultáneamente la temperatura corporal, la tasa metabólica, el crecimiento, el hambre y la sed, el sueño, la química sanguínea, la respiración y otras numerosas funciones. Su coordinación debe ser increíblemente precisa para mantener la salud (el hipotálamo, una pequeña región del cerebro anterior no mayor que la punta de un dedo, coordina docenas de funciones automáticas del cuerpo, lo que le ha valido el apodo de “cerebro del cerebro”).

Pero la verdadera fuente del equilibrio es aún más profunda, a nivel cuántico. Aquí es donde se puede aprovechar nuestro impulso básico de crecer y progresar mediante técnicas especiales que exploraremos. Cuando las fuerzas que actúan contra la vida se imponen, el cuerpo no tiene más remedio que deteriorarse con el paso del tiempo.

En cambio, si aprendemos a vivir en equilibrio desde lo más profundo, nuestro crecimiento interior no tiene límites previsibles. Docenas de libros exponen el valor del crecimiento interior, pero pasan por alto el ingrediente clave que subraya el ayurveda: el crecimiento es automático; está en el plan de la naturaleza, incorporado en nuestras propias células. Solo es cuestión de seguir el silencioso río de la inteligencia hasta su fuente. Ese es el secreto final de la salud perfecta. Si pudiéramos permitir que la mente se expandiera y explorara realidades más elevadas, el cuerpo la seguiría. ¿No bastaría eso para salvarlo de la enfermedad y la vejez?

Solo podemos especular hasta dónde nos llevará la evolución, pero hay casos dramáticos en los que la mente se negó a creer en la enfermedad y el cuerpo le siguió de repente. El año pasado atendí a un paciente suizo llamado Andreas Schmitt, al que se le había diagnosticado un cáncer mortal. Hace año y medio notó un punto doloroso en la espalda que le molestaba cada vez que se inclinaba hacia atrás en su silla. Explorando con los dedos, detectó una zona hinchada del tamaño de una moneda de 10 centavos. Su esposa le dijo que parecía un lunar oscuro agrandado; con el espejo de mano de su esposa, Andreas vislumbró un bulto marrón violáceo situado justo entre los omóplatos.

A partir de entonces, los acontecimientos se precipitaron. Un oncólogo de Ginebra le hizo una biopsia que reveló la presencia de un *melanoma*, el cáncer de piel más agudo y de rápido crecimiento. Al cabo de un día, Andreas fue operado. Los cirujanos extirparon el tumor y exploraron los ganglios linfáticos de la axila derecha. Extirparon 14 ganglios sospechosos; 4 de ellos resultaron tener células de melanoma en su interior. Ahora que el melanoma original había desaparecido, el siguiente paso era irradiar las zonas de la espalda y el hombro para atrapar cualquier célula cancerosa que pudiera quedar. Andreas, un hombre culto de unos 50 años, rechazó la radiación.

## **Chapter V**

### **Data Analysis**

Data analysis is an essential aspect of any research study, as it allows adequate examination of the data collected to draw meaningful conclusions. This chapter focuses on the analysis and interpretation of the results obtained from translating the medical texts "Lipids, Lipoproteins and Atherogenesis" and "Perfect Health". The analysis is carried out using various tools, such as textual analysis tables, color-coding tables, and glossaries, which help to evaluate the effectiveness of the translation techniques applied. The importance of this chapter lies in its ability to provide information on the challenges and strategies involved in translating specialized medical texts, ensuring accuracy, readability, and cultural appropriateness. As Asadova (2024) states, "In the intricate mosaic of global interactions, translators are pivotal figures who bridge linguistic and cultural distances with skill and sensitivity. Their role goes far beyond merely converting a text from one language to another; they act as cultural mediators," which highlights the need for thorough analysis to ensure that translated texts retain the original meaning while remaining accessible to the target audience.

#### **5.1 Analysis and interpretation of the results**

This section discusses the analysis and interpretation of the data collected during the translation of "Lipids, Lipoproteins and Atherogenesis" and "Perfect Health". The analysis focuses on the use of key tools, such as a text analysis chart, color coding, and glossaries, which were used to analyze the texts and the translation techniques applied. This section aims to

evaluate the outcome of the translation strategies employed, examining how well they have managed to convey the original meaning when dealing with the difficulties presented by medical and scientific terminology.

### 5.1.1 Text Analysis.

Text analysis is an essential tool in translation, as it allows for a detailed analysis of source and target texts to detect linguistic and cultural problems. The importance of text analysis lies in its ability to highlight parts where different translation techniques need to be applied.

*Table 1. Text Analysis*

Text Analysis	Perfect Health	Lípidos, Lipoproteínas y Aterogénesis
Text style	Discussion	Discussion
Text function	Informative/ Vocative	Informative
<b>Stylistic style</b>		
Formality	Formal	Formal

Generality or difficulty	Technical	Technical
Emotional tone	Factual	Factual

*Table 1 illustrates the text analysis of both translated documents. Source: Researcher's creation*

### 5.1.2 Color Coding.

Color coding is a visual strategy that uses different shades of color to distinguish and organize various elements of a text. According to Fiveable color-coding techniques not only help to break down complex information but also improve memory retention and clarity in analysis (Fiveable, 2025). In the context of translation, color coding is applied to mark different translation strategies such as borrowing, modulation, and explicitation, allowing translators to quickly identify patterns and address recurring problems.

*Table 2. Color coding*

Transposition
Modulation
Expansion

Explicitation
Literal translation

*Table 2 illustrates the color coding of both translated documents. Source: Researcher's creation*

### **5.1.2.1 Spanish to English**

1. Texto original: Carlos Carvajal Carvajal nació en 1964. Es Especialista en Química Clínica y ha desarrollado su labor profesional en varias instituciones de la Caja Costarricense de Seguro Social (CCSS): Laboratorio Clínico de la Clínica de Palmar Sur; Laboratorio Clínico del Hospital San Vicente de Paúl; Laboratorio Clínico del Hospital Tony Facio Castro; Laboratorio Clínico del Área de Salud del Valle La Estrella; Laboratorio Clínico del Hospital de Guápiles; y Laboratorio Clínico del Hospital México, donde actualmente trabaja. **En su haber** ha publicado varios artículos en diferentes revistas, como la Revista Costarricense de Salud Pública y la **revista** Medicina Legal de Costa Rica.

Carlos Carvajal Carvajal **was born** in 1964. **He** is a specialist in **clinical chemistry** and has developed his **professional work** in several institutions of the **Costa Rican Social Security Fund (CCSS): Clinical Laboratory of the Palmar Sur Clinic, Clinical Laboratory of San Vicente de Paúl Hospital; Clinical Laboratory of Tony Facio Castro Hospital; Valle La Estrella Health Area Clinical Laboratory, Guápiles Hospital Clinical Laboratory; and Clinical Laboratory of Hospital Mexico**, where he currently works. **He** has published several articles in different journals, such as **Revista Costarricense de Salud Pública** and **Medicina Legal de Costa Rica**.

2. Texto original: Las enfermedades cardiovasculares constituyen en la actualidad la principal causa de morbilidad y mortalidad en el mundo. La aterosclerosis es el fenómeno subyacente en estas

enfermedades; y detrás de este se hallan principalmente dos tipos de lípidos implicados: el colesterol y los triglicéridos. El presente trabajo desarrolla el tema de los lípidos y su relación con la aterosclerosis, desde un punto de vista molecular y celular, buscando describir y explicar los diferentes procesos a nivel de las moléculas implicadas, lo cual permite una mejor comprensión y el poder apreciar la maravillosa complejidad existente dentro de la célula. Para abordar los diferentes aspectos relacionados con el tema, el libro se divide en cuatro capítulos

Heart disease remains the leading cause of morbidity and mortality worldwide. Atherosclerosis is the underlying phenomenon driving these diseases; and behind them, there are mainly two types of lipids involved: cholesterol and triglyceride. The present study examines the relationship between lipids and atherosclerosis, from a molecular and cellular point of view, aiming to describe and explain the various processes at the level of the molecules involved, this allows for a deeper understanding and appreciation of the remarkable complexity within the cell. To address the different aspects related to the topic, this book is divided into four chapters.

3. Texto original: Los lípidos son un grupo muy heterogéneo de moléculas orgánicas; e incluyen grasas, aceites, esteroides, ceras y otros compuestos relacionados más por sus propiedades físicas que por sus propiedades químicas. El término lípido se aplica a todo compuesto que tiene la propiedad común de ser relativamente insoluble en el agua y soluble en solventes no polares, como el éter, el cloroformo y la acetona. En su mayor parte, los lípidos consisten de grupos no polares (en general con un alto contenido de carbono e hidrógeno), lo que permite explicar sus características de solubilidad en el agua. Por otro lado, hay algunos lípidos que son más complejos, los cuales contienen grupos no lipídicos, como sulfatos, fosforilos o amino. Químicamente, los lípidos son biomoléculas que al ser sometidas a hidrólisis producen ácidos grasos y alcoholes complejos que se pueden combinar con los ácidos grasos, formando ésteres.

Lipids are a very heterogeneous group of organic molecules and include fats, oils, steroids, waxes, and other compounds related more to their physical properties than their chemical ones. The term lipid refers to all compounds that share the common characteristics of being relatively insoluble in water and soluble in non-polar solvents, such as ether, chloroform, and acetone. Mostly, lipids consist of non-polar groups (in general with a high carbon and hydrogen content), thus explaining their water-soluble characteristics. On the other hand, certain lipids are more complex and contain non-lipidic groups, such as sulfates, phosphoryl, or amino. Chemically, lipids are biomolecules that, when subjected to hydrolysis, yield fatty acids and complex alcohols that can be combined with the fatty acids, forming esters.

4. Texto original: Según su naturaleza química, los lípidos se pueden clasificar en dos grupos o clases principales. Un grupo, que consta de compuestos de cadena abierta con cabezas o grupos polares y largas colas hidrocarbonadas no polares, que incluye a los ácidos grasos, los triacilglicéridos o triglicéridos, los esfingolípidos, los fosfoacilgliceroles y los glucolípidos; y otro grupo que consta de compuestos con anillos fusionados, conocidos como esteroides. Otra clasificación divide a los lípidos en: 1. Lípidos simples: ésteres de ácidos grasos con diversos alcoholes (grasas y ceras). 2. Lípidos complejos: ésteres de ácidos grasos que contienen otros grupos además de un alcohol y un ácido graso (fosfolípidos, glucolípidos y otros lípidos complejos). 3. Lípidos precursores y derivados: comprenden ácidos grasos, glicerol, esteroides, cuerpos cetónicos, hidrocarburos, vitaminas liposolubles y hormonas liposolubles.

According to their chemical nature, lipids can be classified into two groups or main classes. One group, which consists of open-chain compounds with polar heads or groups and long non-polar hydrocarbon tails, includes fatty acids, triacylglycerols or triglycerides, sphingolipids, phosphoacylglycerols, and glycolipids; and another group consisting of compounds with fused rings, known as steroids. In other classification lipids are divided into: 1. Simple lipids: fatty acid esters with different alcohols (fats and waxes). 2. Complex lipids: fatty acid esters that contain other groups besides one alcohol and one fatty acid (phospholipids, glycolipids, and other complex lipids). 3. Precursor lipids and derivatives: they

include fatty acids, glycerol, steroids, ketone bodies, hydrocarbons, fat-soluble vitamins, and fat-soluble hormones.

5. Texto original: Los ácidos grasos son los lípidos más sencillos. Estos son ácidos carboxílicos con cadenas hidrocarbonadas de cuatro a 36 carbonos de longitud. En algunos de ellos la cadena hidrocarbonada es lineal (no ramificada) y saturada (sin dobles enlaces), mientras que en otros la cadena contiene uno o más dobles enlaces. En general, existe un patrón en la localización de los dobles enlaces; en la mayoría de los ácidos grasos monoinsaturados estos se localizan entre los carbonos 9 y 10, mientras que en los ácidos grasos poliinsaturados se localizan en los carbonos 12 y 15. Casi todos los dobles enlaces tienen una configuración cis. Los ácidos grasos más frecuentes tienen un número par de átomos de carbono en una cadena lineal de 12 a 24 carbonos. El número par es consecuencia de la síntesis de los ácidos grasos, realizada a partir de la adición sucesiva de unidades de dos átomos de carbono.

Fatty acids are simpler lipids. These are carboxylic acids with hydrocarbon chains ranging from 4 to 36 carbon in length. In some of them, the hydrocarbon chain is lineal (unbranched) and saturated (without double bonds), while in others the chain contains one or more double bonds. In general, there is a pattern in the localization of double bonds; in most monounsaturated fatty acids these are located between carbons 9 and 10, while in polyunsaturated fatty acids are located between carbons 12 and 15. Almost all double bonds have a cis configuration. The most frequent fatty acids have an even number of carbon atoms in one lineal chain between 12 to 24 carbons. The even number is a result of the synthesis of fatty acids, made from the successive addition of units of two carbon atoms.

6. Texto original: En lo que respecta a las propiedades físicas de los ácidos grasos, y de los compuestos que los contienen, cabe destacar que estas se encuentran determinadas en gran medida por la longitud y el grado de insaturación de la cadena hidrocarbonada. Las cadenas hidrocarbonadas no polares explican la pobre solubilidad de estos compuestos en el agua. Entre mayor sea la longitud de dicha cadena, menor es la solubilidad en el agua. En el caso de los ácidos grasos de cadena corta, la poca solubilidad en el agua es

aportada por el grupo ácido carboxílico. En los mamíferos, los ácidos grasos en el plasma circulan en la sangre unidos a la albúmina, debido a su pobre solubilidad, y dentro de las células están asociados a proteínas transportadoras o almacenados en gotas lipídicas sin contacto con el medio acuoso. Por otra parte, al igual que la solubilidad, los puntos de fusión también están influenciados por la longitud y el grado de insaturación de la cadena hidrocarbonada.

Regarding the physical properties of fatty acids and the compounds containing them, it should be noted that these are largely determined by the length and degree of unsaturation of the hydrocarbon chain. The non-polar hydrocarbon chains explain the poor solubility of these compounds in the water. In the case of short-chain fatty acids, the limited solubility in water is provided by the carboxylic acid group. In mammals, fatty acids in plasma circulate in the blood bound to albumin due to their poor solubility, and within cells, they are associated with transport proteins or stored in lipid droplets without contact with the aqueous medium. On the other hand, like solubility, melting points are also influenced by the length and degree of unsaturation of the hydrocarbon chain.

7. Texto original: Otra clase de lípidos son los llamados fosfolípidos, los cuales se derivan del ácido fosfatídico. En general, hay dos clases de fosfolípidos: los que tienen glicerol como base (fosfoglicéridos) y los que tienen esfingosina como molécula base (esfingolípidos). Independientemente del tipo, todos los fosfolípidos tienen como característica que son moléculas anfipáticas, con un extremo o cabeza polar hidrofílica y una larga cola hidrocarbonada hidrofóbica. Esta característica permite que una misma molécula tenga una porción soluble en agua (la parte polar o hidrofílica) y otra insoluble en agua (la parte hidrofóbica). Esta propiedad

desempeña un papel fundamental para la formación y la estabilidad de las membranas biológicas.

Another class of lipids are the so-called phospholipids, which are derived from phosphatidic acid. In general, there are two classes of phospholipids: those with glycerol as a base (phosphoglycerides) and those with sphingosine as the base molecule (sphingolipids). Regardless of the type, all phospholipids

share the characteristic of being amphipathic molecules, with a polar hydrophilic head and a long hydrophobic hydrocarbon tail. This characteristic allows the same molecule to have a water-soluble portion (the polar or hydrophilic part) and another that is water-insoluble (the hydrophobic part). This property plays a fundamental role in the formation and stability of biological membranes.

8. Texto original: Los fosfoglicéridos constituyen el principal grupo de fosfolípidos; estos tienen dos ácidos grasos unidos al primero y segundo carbono del glicerol y poseen un grupo cargado o altamente polar unido al tercer carbono (grupo fosfato). Estos compuestos son nombrados de acuerdo al alcohol polar unido al grupo fosfato asociado al tercer carbono del glicerol. De tal forma, los fosfolípidos fosfatidilcolina y fosfatidilserina tienen colina y serina unidos a su grupo fosfato polar, respectivamente. Entre los fosfoglicéridos también pueden citarse el fosfatidilinositol y la fosfatidiletanolamina.

Phosphoglycerides constitute the main group of phospholipids; these have two fatty acids attached to the first and second carbons of glycerol and possess a charged or highly polar group attached to the third carbon (phosphate group). These compounds are named according to the polar alcohol attached to the phosphate group associated with the third carbon of glycerol. Thus, the phospholipids phosphatidylcholine and phosphatidylserine have choline and serine attached to their polar phosphate group, respectively. Among the phosphoglycerides, phosphatidylinositol and phosphatidylethanolamine can also be mentioned.

9. Original text: Las cadenas o colas hidrocarbonadas de una capa se interdigitan en el espacio de la otra capa. Este acoplamiento puede ser reducido por el colesterol. Para conocer bien el efecto de este fenómeno de acoplamiento o interdigitación entre las dos capas sobre las propiedades y las funciones de las membranas, se debe tener claro que las membranas delimitan y mantienen la individualidad de la célula y de las organelas. También sirven para almacenar y transducir energía en forma de gradientes electroquímicos. Además, son centros organizadores de funciones tales como el metabolismo y la señalización intracelular, y son estructuras claves en la biología celular. La membrana no es una

estructura homogénea ni azarosa, sino que más bien es altamente asimétrica, con diferente composición de lípidos y proteínas en las dos caras o con capas organizadas, para facilitar funciones celulares específicas.

The hydrocarbon chains or tails of one layer interdigitate in the space of the other layer. This coupling can be reduced by cholesterol. To understand better the effect of this coupling or interdigitation phenomenon between the two layers on the properties and functions of membranes, it must be clear that membranes delimit and maintain the individuality of the cell and organelles. They also serve to store and transduce energy in the form of electrochemical gradients. In addition, they are organizing centers for functions such as metabolism and intracellular signaling and are key structures in cell biology. The membrane is not a homogeneous or eventful structure, but rather is highly asymmetric, with different lipid and protein composition on the two sides or with organized layers, to facilitate specific cellular functions.

10. El colesterol es una molécula lipídica encontrada exclusivamente en los animales y en los seres humanos, aunque todo organismo viviente contiene esteroides de diferente tipo. El colesterol es un alcohol sólido de alto peso molecular y tiene como estructura base al ciclopentanoperhidrofenantreno, una molécula tetracíclica de 17 carbonos. A partir de esta molécula base se adicionan un grupo polar hidroxilo y 10 átomos de carbono, para dar una molécula de 27 átomos de carbono y un grupo polar hidroxilo en su átomo de carbono número 3. El colesterol desempeña un papel vital en el mantenimiento de la fluidez de las membranas celulares y es un precursor para la síntesis de hormonas esteroideas, ácidos biliares y vitamina D.

Cholesterol is a lipid molecule found exclusively in animals and humans, although every living organism contains sterols of different types. Cholesterol is a high molecular weight solid alcohol and has cyclopentanoperhydrophenanthrene as its base structure, a tetracyclic molecule with 17 carbons. From this base molecule, a polar hydroxyl group and 10 carbon atoms are added, resulting in a molecule with 27 carbon atoms and a polar hydroxyl group on its carbon number 3. Cholesterol plays a vital role in

maintaining cell membrane fluidity and is a precursor for the synthesis of steroid hormones, bile acids, and vitamin D.

11. Texto original: La función más conocida de los lípidos es servir como fuente de energía. Los ácidos grasos cuando son oxidados dentro de la célula liberan la energía necesaria para llevar a cabo diversos procesos biológicos: síntesis de moléculas, transporte de sustancias a través de las membranas y movimiento o trabajo mecánico. Debido a que los ácidos grasos dentro de la célula son tóxicos, por su efecto detergente, su almacenamiento celular se realiza en forma de triglicéridos, en gotas lipídicas, para neutralizar dicho efecto. Los triglicéridos son moléculas no polares, insolubles en el agua y químicamente consisten en la unión éster de tres ácidos grasos al glicerol. A nivel tisular, el gran depósito de estos compuestos constituye el tejido adiposo, donde también sirven de aislante térmico de los tejidos subcutáneos y alrededor de ciertos órganos.

Lipids are best known for their role as a source of energy. When fatty acids are oxidized within the cell, they release the energy necessary to carry out various biological processes: synthesis of molecules, transport of substances across membranes, and movement or mechanical work. Because fatty acids are toxic inside the cell due to their detergent effect, their cellular storage occurs in the form of triglycerides, in lipid droplets, to neutralize this effect. Triglycerides are nonpolar molecules, insoluble in water, and chemically consist of the ester linkage of three fatty acids to glycerol. At the tissue level, the large deposit of these compounds constitutes adipose tissue, where they also serve as thermal insulation for subcutaneous tissues and around certain organs.

12. Texto original: Las LDs también almacenan ésteres de colesterol y vitaminas liposolubles. Además, proveen bloques de construcción para las membranas o sustratos para el metabolismo energético, y sirven como centros organizadores para la síntesis de lípidos específicos, como los triglicéridos. En general, casi todas las células tienen la capacidad de sintetizar LDs, cuyo número y tamaño varían de manera significativa en los diversos tipos celulares o entre las células individuales. De tal forma, muchas células

tienen LDs pequeñas, de 100-200 nm de diámetro, mientras que las LDs del tejido adiposo poseen un diámetro de hasta 100  $\mu\text{m}$  y llenan casi todo el citoplasma. El tamaño de estas partículas puede cambiar en corto tiempo, según las condiciones existentes: durante los períodos de lipogénesis las gotas lipídicas crecen rápidamente y se reducen durante los períodos de escasez de nutrientes.

LDs also store cholesterol esters and fat-soluble vitamins. Additionally, they provide building blocks for membranes or substrates for energy metabolism and serve as organizing centers for the synthesis of specific lipids, such as triglycerides. In general, almost all cells can synthesize LDs, the number and size of which change significantly in different cell types or between individual cells. In such a way, lots of cells have small LDs, from 100-200 nm in diameter, while LDs in adipose tissue have a diameter of up to 100  $\mu\text{m}$  and fill almost all the cytoplasm. The size of these particles can change in a short time, according to the existing conditions, during periods of lipogenesis lipid droplets grow rapidly and are reduced during periods of nutrient shortage.

13. Texto original: La utilización de los ácidos grasos requiere su separación del glicerol a partir de los triglicéridos, por un proceso de hidrólisis. Esta hidrólisis requiere de la acción secuencial de la lipasa adipocítica de triglicéridos (ATGL, del inglés 'adipose triglyceride lipase') para hidrolizar estos compuestos a diacilglicerol (DAG) y un ácido graso; de la lipasa sensible a hormonas (HSL del inglés 'hormone-sensible lipase') para hidrolizar el DAG a monoacilglicerol y otro ácido graso; y de la enzima monoacilglicerol lipasa para obtener el glicerol y otro ácido graso. Todo este proceso secuencial de la hidrólisis genera ácidos grasos y glicerol. En condiciones basales, PLIN1 parece reducir la lipólisis, uniéndose a la proteína CGI-58, un activador de la ATGL.

The utilization of fatty acids requires their separation from glycerol through triglycerides via a hydrolysis process. This hydrolysis requires the sequential action of adipose triglyceride lipase (ATGL, from the English "adipose triglyceride lipase") to hydrolyze these compounds into diacylglycerol (DAG) and one fatty acid; hormone-sensitive lipase (HSL, from the English "hormone-sensitive lipase") to hydrolyze

DAG into monoacylglycerol and another fatty acid; and the enzyme monoacylglycerol lipase to obtain glycerol and another fatty acid. This entire sequential hydrolysis process generates fatty acids and glycerol. Under basal conditions, PLIN1 appears to reduce lipolysis by binding to the protein CGI-58, an activator of ATGL.

14. Texto original: Otra función igualmente importante de los lípidos es la de ser constituyentes de las membranas biológicas o plasmáticas. La estructura básica de estas membranas es una bicapa lipídica formada por fosfolípidos. Estas moléculas tienen un carácter anfipático, poseen una región polar, hidrofílica (la cabeza), y otra no polar, hidrofóbica o lipofílica (las dos colas). Esta característica hace posible que los fosfolípidos interactúen de manera simultánea con sustancias polares y no polares. Además, esta propiedad les permite constituirse en las moléculas claves de las membranas celulares. En una solución acuosa, los fosfolípidos tienden a formar espontáneamente bicapas, con la región polar orientada hacia el exterior, en contacto con la fase acuosa a ambos lados, y la región no polar orientada hacia el interior, formando el centro hidrofóbico de la bicapa, y alejada del agua.

Another equally important function of lipids is to be constituents of biological or plasmatic membranes. The basic structure of these membranes is a lipid bilayer formed by phospholipids. These molecules have an amphipathic nature, possessing a polar, hydrophilic region (the head) and a nonpolar, hydrophobic, or lipophilic (the two tails). This characteristic allows phospholipids to interact simultaneously with both polar and nonpolar substances. Additionally, this property enables them to serve as the key molecules of cellular membranes. In an aqueous solution, phospholipids tend to spontaneously form bilayers, with the polar region-oriented outward, in contact with the aqueous phase on both sides and the nonpolar region-oriented inward, forming the hydrophobic core of the bilayer and away from the water.

15. Texto original: Los diferentes cambios en la composición de los ácidos grasos de los fosfolípidos resultan en cambios en las propiedades fisicoquímicas de la bicapa, tales como la flexibilidad y la fluidez.

En la mayoría de los casos, los fosfolípidos tienen un ácido graso saturado en la posición 1 y uno insaturado en la posición 2 del glicerol. Los dobles enlaces en los ácidos grasos están en configuración cis, produciendo una torsión en la cadena hidrocarbonada. Esta torsión ocasiona que estos ácidos en la membrana no se empaquen tan estrechamente, como sí ocurre con los ácidos grasos saturados, produciendo agregados o estructuras fluidas y flexibles. A nivel visual, los dos ácidos grasos de una molécula de fosfolípido semejan una forma cilíndrica, con un área de superficie denominada como 'A'. La insaturación comparada con la saturación resulta en un valor mayor de A.

The different changes in the fatty acids composition of phospholipids result in changes in the physicochemical properties of the bilayer, such as flexibility and fluidity. In most cases, phospholipids have a saturated fatty acid in position 1 and an unsaturated one in position 2 of the glycerol. The double bonds in the fatty acids are in the cis configuration, causing a bend in the hydrocarbon chain. This bend prevents these acids in the membrane from packing as tightly as saturated fatty acids do, resulting in fluid and flexible aggregates or structures. At a visual level, the two fatty acids of a phospholipid molecule resemble a cylindrical shape, with a surface area denominated as "A". Unsaturation compared to saturation results in a higher A value.

### ***5.1.2.2 English to Spanish***

1. Original text: **There** exists in every person a place that is free from disease, that never feels pain, that cannot age or die. When you go to this place, limitations which all of us accept cease to exist. **They** are not even entertained as a possibility. This is the place called perfect health. Visits to this place may be very brief, or they may last for many years. Even the briefest visit, however, instills a profound change. As long as you are there, the assumptions that hold true for ordinary existence are altered, and the possibility of a new existence, higher and more ideal, begins to flower. This book is for people who would like to explore this new existence, bring it into their lives, and make it permanent.

En cada persona existe un lugar libre de enfermedad, que nunca siente dolor, que no puede envejecer o morir. **Cuando llegas a este lugar**, limitaciones que todos aceptamos dejan de existir. Ni siquiera son

considerados como una posibilidad. Este lugar se conoce como Salud Perfecta. Las visitas a este lugar pueden ser bastante breves, o puede durar por bastantes años. Sin embargo, incluso la visita más breve inculca un profundo cambio. Mientras estés ahí, las suposiciones que se mantienen como algo ordinario son cambiadas, y la posibilidad de una nueva existencia, superior y más ideal, empieza a florecer. Este libro es para personas que quieren explorar esta nueva existencia, incorporarla en sus vidas y hacerla permanente.

2. Original text: The cause of disease is often extremely complex, but one thing can be said for certain: no one has proved that getting sick is necessary. Quite the opposite, in fact. Every day we come in contact with millions of viruses, bacteria, allergens, and fungi, and only the tiniest fraction ever lead to disease. It is not uncommon for doctors to see patients whose respiratory tracts contain clusters of virulent meningococcus bacteria living there harmlessly. Only on rare occasions do they break out and cause meningitis, a serious and at times fatal infection of the central nervous system. What provokes such an attack? No one knows precisely, but it seems to involve a mysterious factor called "control by the host," meaning that we, the host of germs, somehow open or close the gate to them. More than 99.99 percent of the time, the gate is closed, which implies that each of us is much closer to perfect health than we realize

Con frecuencia, la causa de las enfermedades es extremadamente compleja, pero se puede afirmar una cosa con seguridad, nadie ha demostrado que enfermarse sea necesario. De hecho, es completamente lo opuesto. Todos los días entramos en contacto con millones de virus, bacterias, alérgenos y hongos; y solo la fracción más pequeña conduce a la enfermedad. No es raro para los doctores ver pacientes cuyos tractos respiratorios contienen cúmulos de bacterias meningocócicas agudas viviendo ahí inofensivamente. Solo en raras ocasiones brotan causando meningitis, una seria y muchas veces fatal infección del sistema nervioso central. ¿Qué provoca tal ataque? Nadie sabe con precisión, pero parece implicar un misterioso factor conocido como "control del anfitrión", implicando que nosotros, como los

huéspedes de los gérmenes, de alguna manera les abrimos o cerramos la puerta. Más del 99.99 % del tiempo, la puerta está cerrada, lo que insinúa que cada uno de nosotros está más cerca de la salud perfecta de lo que nos damos cuenta.

3. Original text: The leading cause of death in the United States is heart disease, which in most cases is caused by deposits of plaque blocking the coronary arteries that conduct oxygen to the heart. When cholesterol and other debris begin to obstruct these arteries, oxygen starvation threatens to impair the heart's function. Yet the course of heart disease is highly personal. One person with a single, rather small bit of plaque can be incapacitated by angina, the squeezing chest pain symptomatic of coronary artery disease. A second person with several deposits of plaque large enough to block most of the oxygen flow to the heart might feel nothing. People whose coronary arteries were 85 percent blocked have been known to run marathons, while others have dropped dead of a heart attack with completely clean vessels. Our physical ability to repel disease is extremely flexible

La mayor causa de muerte en los Estados Unidos son las enfermedades cardíacas, las cuales en muchas ocasiones son causadas por depósitos de placa bloqueando las arterias coronarias que llevan oxígeno al corazón. Cuando el colesterol y otros restos comienzan a obstruir estas arterias, la falta de oxígeno amenaza con dañar la función del corazón. Pese a ello, la evolución a enfermedades cardíacas es altamente personal. Una persona con un único trozo de placa bastante pequeño puede quedar incapacitada por una angina, el dolor de pecho asfixiante sintomático de la enfermedad arterial coronaria. Una segunda persona con varios depósitos de placa lo suficientemente grandes para bloquear la mayoría del flujo de oxígeno al corazón podría no sentir nada. Personas cuyas arterias coronarias fueron bloqueadas en un 85 por ciento han sido conocidas por correr maratones, mientras que otros han muerto de un ataque al corazón con los vasos completamente limpios. Nuestra habilidad física para repeler enfermedades es extremadamente flexible.

4. Original text: In addition to our body's physical immunity, we all have strong emotional resistance to sickness. **As one woman**, an older patient of mine, put it, "I've read enough psychology to know that a well-adjusted adult is supposed to become reconciled to getting sick, growing old, and eventually dying. At some level I have understood that but emotionally and instinctively, I don't believe it at all. Getting sick and deteriorating physically seem like a ghastly mistake, and I've always hoped someone would come along to correct it." This woman is nearly 70 now, and her physical and mental condition is excellent. When asked what lies ahead, she said. You may think this is crazy, but my attitude is that I'm not going to get old, and I'm not going to die. Is that so unreasonable? People who consider themselves "too busy to get sick" are known to have above-average health, while those who worry excessively about disease fall prey to it more often.

Además de **la inmunidad física de nuestro cuerpo**, todos tenemos una fuerte **resistencia emocional a la enfermedad**. Como una **antigua** paciente mía **dijo**: "He leído suficiente psicología para saber que **se supone** que un **adulto equilibrado se reconcilia** con **enfermarse, envejecer** y eventualmente morir. En algún punto he entendido eso, pero emocional e instintivamente, no lo creo **en absoluto**. **Enfermarse y deteriorarse** físicamente parece como un **error espantoso**, y siempre **he esperado** que alguien viniera a corregirlo". Actualmente, esta mujer tiene casi 70 años, y su **condición física y mental** es excelente. Cuando **se le preguntó qué esperaba**, ella dijo: "Pensarás que esto es **una locura**, pero mi actitud es que no voy a **envejecer**, que no voy a morir". **¿Es eso tan disparatado?** **Las** personas que consideran que están "muy ocupadas para **enfermarse**" son conocidas por tener una **salud superior** a la media, mientras que **los que se preocupan** excesivamente por **enfermedades son presa** de ellas con más frecuencia.

5. Original text: Breakthrough thinking is a unique form of problem solving: it involves making a situation better by first raising your expectations much higher than anyone believes possible and then looking for always to make your vision come true. "If people continue to think and act in the same

familiar ways." this man commented, "they may accomplish five to ten percent improvements by working harder." However, to get improvements of two to ten times, targets must be set high enough that people say, Well, if you want that such improvement, we'll have to do this an entirely different way.

Breakthrough thinking has been applied among advanced computer companies in Silicon Valley-for example, if the current model of some hardware or software took forty-eight months to develop, the next generation is scheduled for twenty-four months. If defects in manufacturing have been cut down to 5 percent, then "zero defects" becomes the rule for the future.

El pensamiento innovador es una forma única de resolución de problemas; implica hacer una mejor situación elevando sus expectativas mucho más alto de lo que alguien creería posible y después buscar maneras de cómo hacer que su visión se haga realidad. "Si las personas continúan pensando y actuando de las mismas maneras de siempre", este hombre comentó, "ellos podrían lograr entre un 5 y un 10 por ciento de mejoras trabajando más duro". Sin embargo, para tener mejoras de 2 a 10 veces, los objetivos deben estar lo suficientemente altos para que la gente diga: "Bueno, si quieres mejorar tanto, debemos hacer esto de una forma totalmente diferente". El pensamiento innovador ha sido aplicado entre empresas informáticas avanzadas de Silicon Valley, por ejemplo, si el modelo actual de algún hardware o software toma 48 meses en desarrollarse, la siguiente generación estará programada por 24 meses. Si los defectos en manufactura han sido reducidos en un 5%, entonces tener "cero defectos" se convierte en la norma para el futuro.

6. Original text: The first secret you should know about perfect health is that you have to choose it. You can only be as healthy as you think it is possible to be. Perfect health is no mere 5 or 10 percent improvement over good health. It involves a total shift in perspective which makes disease and infirm old age unacceptable. Can we really believe in "zero defects" for something as complex as the human body? According to the National Institute on Aging, no diet, exercise, vitamin, drug, or lifestyle change has

proved itself capable of reliably extending life: Averting the degenerative disorders that afflict the elderly heart disease, stroke, cancer, arteriosclerosis, arthritis, diabetes, osteoporosis, and so on-is more feasible than ever before but still unlikely. Although in public medical researchers speak optimistically of major breakthroughs in curing cancer and the other major intractable illnesses, they are much more pessimistic among themselves. The best that they hope for is creeping gradualism-taking one tiny step at a time toward a solution.

El primer secreto de la salud perfecta que debe saber es que tiene que elegirla; solo puede ser tan saludable como crea que es posible. La salud perfecta no se trata simplemente de una mejora del 5 o 10 % sobre la buena salud. Implica un cambio total de perspectiva, que considere la enfermedad y la vejez enfermiza como algo inaceptable. ¿Realmente podemos creer en tener "cero defectos" en algo tan complejo como el cuerpo humano? De acuerdo con el Instituto Nacional sobre el Envejecimiento, ninguna dieta, ejercicio, vitamina, fármaco o cambio de estilo de vida ha demostrado ser capaz de prolongar la vida de manera fiable. Evitar los problemas degenerativos que afectan a los mayores - problemas cardíacos, accidentes cerebrovasculares, cáncer, arteriosclerosis, artritis, diabetes, osteoporosis, etc. - es más posible que nunca, pero aún improbable. Aunque los investigadores médicos del sector público hablan con optimismo sobre los avances significativos en la cura del cáncer y otras enfermedades graves intratables, entre ellos son mucho más pesimistas. Lo mejor que pueden esperar es un progreso gradual, tomando un pequeño paso a la vez hacia una solución.

7. Original text: The purpose of Ayurveda is to tell us how our lives can be influenced, shaped, extended, and ultimately controlled without interference from sickness or old age. The guiding principle of Ayurveda is that the mind exerts the deepest influence on the body, and freedom from sickness depends upon contacting our own awareness, bringing it into balance, and then extending that balance to the body. This state of balanced awareness, more than any kind of physical immunity, creates a higher state of

health. Ayurveda embodies the collected wisdom of sages who began their tradition many centuries before the construction of the Pyramids and carried it forward generation after generation. A modernized system based on their insights-Maharishi Ayurveda-did not come to the West until 1985. It is named after Maharishi Mahesh Yogi, the founder of Transcendental Meditation, who turned his attention to reviving Ayurveda in the early 1980s. I was fortunate to be one of the first M.D.'s to offer this new medicine: I have treated more than ten thousand patients with it in the past five years and trained nearly one hundred other physicians in Ayurvedic theory and practice.

El propósito del ayurveda es decirnos cómo nuestras vidas pueden ser influenciadas, **formadas**, prolongadas y, finalmente, controladas sin la interferencia de enfermedades o **edades avanzadas**. El principio básico del ayurveda es que la mente ejerce **la mayor** influencia en el cuerpo, y la liberación de las enfermedades depende de estar en contacto con nuestra conciencia, alcanzar un equilibrio y luego extender ese balance hacia el cuerpo. Este estado de **conciencia en equilibrio**, más que cualquier tipo de **inmunidad física**, crea un **mejor estado de salud**. El ayurveda encarna la sabiduría de los sabios que comenzaron su tradición muchos siglos antes de la construcción de las pirámides y lo han llevado adelante generación tras generación. Un **sistema modernizado** basado en sus perspectivas, **ayurveda Maharishi**, no llegó al occidente hasta 1985. **Recibe** su nombre de Maharishi Mahesh Yogi, el fundador de la **meditación trascendental**, quien **puso su atención en traer de vuelta el** Ayurveda a principios de 1980. Fui afortunado de ser uno de los primeros médicos en ofrecer esta nueva medicina; he atendido a más de diez mil pacientes con él en los últimos cinco años y he entrenado **a casi** otros cien médicos **en la teoría y práctica ayurvédica**.

8. Original text: The quantum mechanical body is the **underlying** basis for everything we are: thoughts, emotions, proteins, cells, organs-any visible or invisible part of ourselves. At the quantum level. your body is sending out all kinds of invisible signals, waiting for you to pick them up. You have a quantum

pulse underlying your physical one, and a quantum heart beating it out. In fact, Maharishi Ayurveda holds that all the organs and processes in your body have a quantum equivalent. The quantum mechanical body would do us very little good if we could not detect it. Fortunately, human awareness is capable of sensing these faint vibrations, thanks to the incredible sensitivity of our nervous system. A single photon of light falling upon the retina of the eye makes far less impact than a single speck of dust falling on a football field. Yet the specialized nerve endings of the retina, the rods and cones, can actually detect a single photon, send a message to the brain, and cause you to see its light.

El cuerpo humano mecánico cuántico es la base de todo lo que somos; pensamientos, emociones, proteínas, células, órganos, cualquier parte de nosotros, visible o no. A nivel cuántico, su cuerpo envía todo tipo de señales invisibles, esperando a que las captes. Tiene un pulso cuántico bajo su pulso físico y un corazón cuántico latiendo con fuerza. De hecho, el ayurveda Maharishi sostiene que todos los órganos y procesos en el cuerpo tienen un equivalente cuántico. El cuerpo humano mecánico cuántico nos beneficiaría muy poco si no pudiéramos detectarlo. Afortunadamente, la conciencia humana es capaz de percibir estas débiles vibraciones, gracias a la increíble sensibilidad de nuestro sistema nervioso. Un solo fotón de luz cayendo en la retina del ojo tiene mucho menos impacto que una sola partícula de polvo cayendo sobre un campo de fútbol. Sin embargo, las terminaciones nerviosas especializadas de la retina, los bastones y los conos, pueden detectar un solo fotón, enviar el mensaje al cerebro y hacer que vea su luz.

9. Original text: The silence inside us is the key to the quantum mechanical body. It is not a chaotic but an organized silence. It has shape and design, purpose and processes, just like the physical body. Instead of seeing your body as a collection of cells, tissues, and organs, you can use the quantum perspective to see it as a silent flow of intelligence, a constant bubbling up of impulses that create, control, and become your physical body. The secret of life at this level is that anything in your body can be changed with the flick

of an intention. You may find this hard to believe, so let me offer the example of Timmy, a perfectly ordinary-seeming 6-year-old who suffers from one of the strangest of psychiatric syndromes-multiple personality disorder. Timmy has more than a dozen separate personalities, each with its own emotional patterns, vocal inflections, likes and dislikes. Yet people with multiple personalities are not just psychological cases; as they drop one personality and put on another, remarkable changes can occur in their bodies.

El silencio dentro de nosotros es la clave para el cuerpo mecánico cuántico. No es un [lugar caótico](#), sino organizado. Tiene forma y diseño, propósito y procesos, igual que el cuerpo físico. En vez de ver a su cuerpo como un conjunto de células, tejidos y órganos, puede usar la perspectiva cuántica para verlo como un flujo silencioso de inteligencia, un burbujeo constante de impulsos que crean, controlan y se convierten en su cuerpo físico. El secreto de la vida a este nivel es que cualquier cosa en su cuerpo puede ser cambiada con el simple impulso de una intención. Puede que resulte difícil de creer, así que permítame ofrecer el ejemplo de Timmy, un niño de 6 años, aparentemente normal, que padece uno de los síndromes psiquiátricos más extraños: trastorno de personalidad múltiple, cada una con sus propios patrones emocionales, inflexiones vocales, gustos y aversiones. Aun así, las personas con múltiples personalidades no son meros casos psicológicos; ya que a medida que abandonan una personalidad y asumen otra, pueden manifestarse cambios notables en sus cuerpos.

10. Original text: We all tend to see our bodies as "frozen sculptures" solid, fixed, material objects-when in truth they are more like rivers, constantly changing, flowing patterns of intelligence. The Greek philosopher Heraclitus declared. "You cannot step into the same river twice, for fresh waters are ever flowing in." The same is true of the body. If you "pinch an inch" around your waist, the fat you are squeezing between your fingers is not the same as it was last month. Your adipose tissues (fat cells) fill up with fat and empty out constantly, so that all of it is exchanged every three weeks. You acquire a new

stomach lining every five days (the innermost layer of stomach cells is exchanged in a matter of minutes as you digest food). Your skin is new every five weeks. Your skeleton, seemingly so solid and rigid, is entirely new every three months. In all, the flow of oxygen, carbon, hydrogen, and nitrogen is so rapid that you could be renewed in a matter of weeks; it is only the heavier atoms of iron, magnesium, copper, and so on that slow down the process.

Tendemos a percibir nuestros cuerpos como "esculturas congeladas", objetos sólidos, fijos y materiales, cuando en realidad se asemejan más a ríos en constante cambio, manifestaciones dinámicas del flujo de la inteligencia. El filósofo griego Heráclito declaró: "No puedes andar por el mismo río dos veces, porque siempre fluyen aguas frescas en él". Lo mismo pasa con el cuerpo; si pellizca un poco alrededor de su cintura, la grasa que aprieta entre los dedos no es la misma que la del mes pasado. Su tejido adiposo (células de grasa) se llena de grasa y se vacía constantemente de modo que se renuevan en su totalidad cada tres semanas. El revestimiento del estómago se renueva cada cinco días (la capa más interna de células estomacales se reemplaza en cuestión de minutos al digerir los alimentos). La piel se renueva cada cinco semanas. El esqueleto, aparentemente tan sólido y rígido, se renueva por completo cada tres meses. En total, el flujo de oxígeno, carbono, hidrógeno y nitrógeno es tan rápido que usted podría ser renovado en cuestión de semanas; solo los átomos más pesados del hierro, magnesio, cobre, etc., ralentizan el proceso.

11. If life can be so flexible and dynamic, the wonder is that we do not last longer. And we would, if we knew how to handle the balance of forces that are at work in and around us. The ancient sages of Ayurveda were bold enough to ask the ultimate question: Must we become sick and grow old at all? Their answer was no. If the forces inside us are kept in harmony and in balance with the surrounding environment, we can be immune to illness. Perfect balance makes perfect health possible. In Maharishi Ayurveda we rely on the basic principle that any disorder can be prevented as long as balance is

maintained, not just in the body, but in the mind and spirit as well. The Ayurvedic sages teach that there is an impulse in all of us to grow and progress. This impulse governs our overall balance automatically; it can be seen at work in every cell, but particularly in the brain, which simultaneously balances body temperature, metabolic rate, growth, hunger and thirst, sleep, blood chemistry, respiration, and numerous other functions.

Si la vida puede ser tan flexible y dinámica, lo sorprendente es que no duremos más tiempo. Y lo haríamos, si supiéramos manejar el equilibrio de fuerzas que actúan en nosotros y a nuestro alrededor. Los antiguos sabios del Ayurveda se atrevieron a plantear la pregunta definitiva: ¿Debemos enfermar y envejecer? Su respuesta fue negativa. Si las fuerzas de nuestro interior se mantienen en armonía y en equilibrio con el entorno que nos rodea, podemos ser inmunes a la enfermedad. El equilibrio perfecto hace posible la salud perfecta. En el ayurveda Maharishi nos basamos en el principio básico de que cualquier trastorno puede prevenirse siempre y cuando se mantenga el equilibrio, no solo en el cuerpo, sino también en la mente y el espíritu. Los sabios del ayurveda enseñan que hay un impulso en todos nosotros para crecer y progresar. Este impulso gobierna nuestro equilibrio general automáticamente, se puede ver en funcionamiento en cada célula, pero particularmente en el cerebro, que equilibra simultáneamente la temperatura corporal, la tasa metabólica, el crecimiento, el hambre y la sed, el sueño, la química sanguínea, la respiración y otras numerosas funciones.

12. Original text: This past year I saw a Swiss patient named Andreas Schmitt who had been diagnosed with a fatal cancer. A year and a half ago he noticed a sore spot on his back that bothered him whenever he leaned back in his chair. Exploring with his fingers, he detected a swollen area about the size of a dime. His wife said it looked like an enlarged dark mole; angling with his wife's hand mirror, Andreas caught a glimpse of a purplish-brown growth located squarely between his shoulder blades. Events moved quickly and grimly after that. An oncologist in Geneva took a biopsy, which revealed the presence of

melanoma, the most virulent and fastest-spreading form of skin cancer. Within a day Andreas was operated on. The surgeons removed the growth and explored the lymph nodes **under** the right armpit. Fourteen suspected nodes were removed; four of them turned out to have melanoma cells inside. Now that the original melanoma was gone, the next step was to radiate the sites on his back and shoulder to catch any stray cancer cells that might remain. Andreas, a well-educated man in his early fifties, refused the radiation.

El año pasado **atendí a un paciente suizo** llamado Andreas Schmitt al que **se le había diagnosticado un cáncer mortal**. Hace año y medio notó un **punto doloroso** en la espalda que le molestaba cada vez que **se inclinaba** hacia atrás en su silla. Explorando con **los dedos**, detectó una **zona hinchada** del tamaño **de una moneda de diez centavos**. Su esposa le dijo que parecía un **lunar oscuro agrandado**; con el **espejo de mano de su esposa**, Andreas **vislumbró** un **bulto marrón - violáceo** situado justo entre los omóplatos. **A partir de entonces, los** acontecimientos **se precipitaron**. Un oncólogo de Ginebra **le hizo** una biopsia que reveló la presencia de un melanoma, **el cáncer de piel más agudo y de rápido crecimiento**. **Al cabo de un día**, Andreas fue operado. Los cirujanos extirparon el **tumor** y exploraron los **ganglios linfáticos de la axila derecha**. Extirparon catorce **ganglios sospechosos**; cuatro de ellos resultaron tener **células de melanoma en su interior**. Ahora que el **melanoma original** había desaparecido, el siguiente paso era irradiar las zonas de la espalda y el hombro para **atrapar** cualquier **célula cancerosa** que pudiera quedar. Andreas, un **hombre culto** de unos cincuenta años, rechazó la radiación.

13. Original text: Maharishi Ayurveda would say that Ornish's breakthrough for heart disease holds true for any disorder, once you know how to make use of the quantum mechanical body. A deposit of cholesterol-filled plaque looks solid, like rust lining an old pipe, but plaque is alive and changing, just like the rest of the body. New fat molecules drift in and out of it, new capillaries develop to bring in oxygen and food. The real news from Ornish's study is that what we build in our bodies we can also unbuild. A

man who dies of a heart attack at age fifty has had innumerable chances to build new arteries. A 70-year-old woman who develops osteoporosis in her spine has had innumerable chances to make a healthy spine. (We cannot really count the chances, since the process of change is constant, however, you could possibly heal a damaged artery or a defective bone in a matter of a few weeks or months.) We are all building new bodies all the time. Why not build a healthy artery, a healthy spine, a complete and healthy person?

El Ayurveda Maharishi hubiera dicho que el descubrimiento de Ornish sobre las enfermedades cardíacas es verdad para cualquier enfermedad, una vez que sabe hacer uso del cuerpo mecánico cuántico. Un depósito de placa lleno de colesterol se ve sólido, como el óxido que recubre una vieja tubería, pero la placa está viva y cambiando, como el resto del cuerpo. Nuevas moléculas de grasa entran y salen de ella, se desarrollan nuevos capilares para aportar oxígeno y alimentos. Las verdaderas revelaciones del estudio de Ornish son que aquello que creamos también podemos revertirlo. Un hombre que muere de un ataque al corazón a la edad de cincuenta años ha tenido innumerables oportunidades de desarrollar arterias nuevas. Una mujer de 70 años que desarrolla osteoporosis en su columna vertebral ha tenido innumerables oportunidades de desarrollar una columna vertebral sana. (Realmente no podemos contar las oportunidades; sin embargo, puede sanar una arteria dañada o un hueso defectuoso en cuestión de semanas o meses). Todos estamos construyendo nuevos cuerpos todo el tiempo, ¿por qué no construir una arteria sana, una columna vertebral sana, una persona completamente sana?

14. Original text: In India's ancient Vedic tradition, the most basic force underlying all of nature is intelligence. The universe, after all, is not "energy soup"; it is not mere chaos. The incredibly exact fit of things in our world-above all, the astonishing existence of DNA -argues for an infinite amount of intelligence in nature. As one astrophysicist put it, the likelihood that life was created randomly is about the same as the likelihood that a hurricane could blow through a junkyard and create a Boeing 707. One of the most crucial changes in contemporary science is the sudden arrival on the scene of models that take

intelligence into account as a vital force in the universe. (In physics, for example, there is the so-called anthropic principle, which proposes that the whole of creation since the Big Bang was designed expressly to lead to the existence of man.) Why is this relevant to us? Because Maharishi Ayurveda, seen in its larger context, is nothing less than a technology for contacting the quantum level inside ourselves.

En la antigua tradición védica de la India, la fuerza más básica que yace en toda la naturaleza es la inteligencia. Después de todo, el universo no es solo una "sopa de energía", no es solamente caos. El asombroso equilibrio de las cosas en nuestro mundo y, sobre todo, la asombrosa existencia del ADN sustenta a favor de una cantidad infinita de inteligencia en la naturaleza. Como dijo un astrofísico, la probabilidad de que la vida se haya originado al azar es tan baja como la de un huracán que atraviesa un depósito de chatarra y ensambla un Boeing 707. Uno de los cambios más importantes en la ciencia moderna es la aparición repentina de modelos que consideran la inteligencia como una fuerza vital del universo. (En física, por ejemplo, existe el llamado principio antrópico, que propone que toda la creación desde el Big Bang fue diseñada explícitamente para propiciar la existencia del hombre). ¿Por qué esto es relevante para nosotros? Porque el ayurveda Maharishi, visto en su contexto más amplio, no es menos que una tecnología para contactar el nivel cuántico dentro de nosotros.

15. Original text: Breakthrough thinking has been applied among advanced computer companies in Silicon Valley-for example, if the current model of some hardware or software took forty-eight months to develop, the next generation is scheduled for twenty-four months. If defects in manufacturing have been cut down to 5 percent, then "zero defects" becomes the rule for the future. That is exactly how perfect health works it sets zero defects as the goal and then discovers how the goal can be met. In the computer world, it may cost eight to ten times more to repair a defective machine than to make it defect-free in the first place. For that reason, imposing "quality at the source" (i.e., doing things right the first time) makes better business sense than going for engineering that is merely "good enough." The same is true in

medicine, where prevention is much cheaper than treatment, both in human and in economic terms. A 1988 poll shows that more than anything else, Americans fear catastrophic illness. The reason doesn't have to do with pain and suffering, it involves the crushing expense of a long hospital stay and the devastating costs of whatever surgeries and drugs are required.

El pensamiento innovador ha sido aplicado entre empresas informáticas avanzadas de Silicon Valley, por ejemplo, si el modelo actual de hardware o software toma 48 meses en desarrollarse, la siguiente generación estará programada por 24 meses. Si los defectos en manufactura han sido reducidos en un 5 por ciento, entonces tener "cero defectos" se convierte en la norma para el futuro. Así es exactamente cómo la salud perfecta funciona: establece como objetivo tener cero defectos y luego cómo alcanzar ese objetivo. En el mundo informático, puede llegar a costar de 8 a 10 veces más reparar una máquina defectuosa que hacerla sin defectos desde un principio. Por esa razón, imponer "calidad desde el origen" (es decir, hacer las cosas bien desde el principio) tiene más sentido comercial que optar meramente por tecnología lo "suficientemente buena". Lo mismo aplica en medicina, donde la prevención es mucho más barata que el tratamiento, en ambos términos humanos y económicos. Una encuesta hecha en 1988 muestra que más que cualquier otra cosa, los estadounidenses les temen a enfermedades graves. La razón no tiene nada que ver con el dolor y el sufrimiento, sino que involucra los gastos abrumadores de largas estadías en hospitales y los masivos costos de cualquier cirugía y medicamentos que sean requeridos.

### 5.1.3 Glossary.

A glossary is an indispensable reference tool that compiles key or complicated terms and their definitions, thus serving as a foundation for ensuring terminological consistency throughout the translation process. According to the TWB Community Forum, glossaries help translators standardize vocabulary, ensuring that the same terminology is used consistently across documents and projects (TWB Community Forum, 2024).

***Table 3. Glossaries******5.1.3.1. Spanish to English***

The main function of the Spanish to English glossary is to define complicated words that most people would not understand, thus ensuring clarity and understanding for a wider audience. By defining terminology, the glossary avoids creating confusion for readers who are not familiar with complex concepts. In order to define these terms, the National Institutes of Health Medical Dictionary and the Cambridge Dictionary were used.

Source Language	Target Language	Grammatical Category	Definition
Spanish	English	Noun	Amphitropic proteins: Proteins that can exist in both soluble and membrane-bound forms, depending on cellular conditions.
Spanish	English	Noun	Cis configuration: A molecular arrangement where functional groups are on the same side of a double bond, common in unsaturated fatty acids.
Spanish	English	Noun	Ectopic lipid accumulation: The abnormal storage of lipids in non-adipose tissues, such as the liver or muscles.
Spanish	English	Noun	Endoplasmic reticulum: A network of membranes in cells involved in lipid synthesis and protein folding.
Spanish	English	Noun	Fat-soluble vitamins: Vitamins (A, D, E,

			K) that are stored in lipids and require fat for absorption.
Spanish	English	Noun	Fatty streak: The earliest visible sign of atherosclerosis, consisting of lipid-laden macrophages in the arterial wall.
Spanish	English	Noun	Glycolipids: Lipids with attached carbohydrate groups, important in cell recognition and membrane structure.
Spanish	English	Noun	Glycosylation: The addition of carbohydrate groups to proteins or lipids, often occurring on the extracellular side of cell membranes.
Spanish	English	Noun	Hydrophobic interactions: Non-covalent interactions between nonpolar molecules that drive the formation of lipid bilayers.
Spanish	English	Noun	Insulin resistance: A condition in which

			cells fail to respond effectively to insulin, leading to elevated blood sugar levels.
Spanish	English	Noun	Ketone bodies: Molecules produced during the breakdown of fatty acids, used as an alternative energy source during fasting.
Spanish	English	Noun	Lipid droplets: Organelles that store neutral lipids, such as triglycerides and cholesterol esters, within cells.
Spanish	English	Noun	Lipid homeostasis: The balance of lipid synthesis, storage, and breakdown within cells and tissues.
Spanish	English	Noun	Lipid peroxidation: The oxidative degradation of lipids, often leading to cell damage.
Spanish	English	Noun	Lipid rafts: Microdomains in the cell membrane rich

			in cholesterol and sphingolipids, involved in cell signaling and membrane organization.
Spanish	English	Noun	Membrane fluidity: The ability of lipids and proteins to move within the plane of the cell membrane, influenced by temperature and lipid composition.
Spanish	English	Noun	Membrane potential: The difference in electric charge across a cell membrane, essential for cellular communication.
Spanish	English	Noun	Metabolic syndrome: A cluster of conditions (e.g., high blood pressure, high blood sugar, excess body fat) that increases the risk of heart disease and diabetes.
Spanish	English	Noun	Microdomains: Small, specialized

			regions within cell membranes, such as lipid rafts, that organize signaling molecules.
Spanish	English	Noun	Perilipins: Proteins associated with lipid droplets that regulate lipid storage and breakdown.
Spanish	English	Noun	Phosphatidylcholine: A major phospholipid in cell membranes, involved in membrane structure and signaling.
Spanish	English	Noun	Sterols: A subgroup of steroids, including cholesterol, that play key roles in cell membrane structure and signaling.
Spanish	English	Noun	Trans configuration: A molecular arrangement where functional groups are on opposite sides of a double bond, less common in natural lipids.

Spanish	English	Noun	Van der Waals forces: Weak intermolecular forces that contribute to the stability of lipid bilayers.
Spanish	English	Noun	$\beta$ -oxidation: A metabolic process that breaks down fatty acids to generate energy.

*Table 3 Glossary of the most relevant terminology found in the texts. Source Researcher's creation*

### **5.1.3.2. English to Spanish**

The importance of the English-to-Spanish glossary is to define complex terms that may be difficult for the general public to understand. Technical and scientific texts often contain very complicated terminology, and a glossary helps readers understand specialized concepts without being confused. This is especially important in medical and health translations, as in this case, where misinterpretation could lead to misinformation or errors. To create this glossary, several sources were consulted to provide accurate definitions of complex terms. These sources include the Diccionario de la Lengua Española of the Royal Spanish Academy (RAE), the Cancer Dictionary of the National Cancer Institute, and the MedlinePlus Medical Encyclopedia, which

provides very accurate medical terminology. In addition, articles from E-Fly Academy, GQ Mexico, Latin America, and Techno-Science.Net were consulted for specific technical concepts.

Source Language	Target Language	Grammatical Category	Definition
English	Spanish	Noun	Accidente cerebrovascular: Interrupción repentina del flujo sanguíneo al cerebro, lo que puede causar daño neurológico.
English	Spanish	Noun	Alérgeno: Sustancia que, al ser introducida en el organismo, provoca una reacción alérgica.
English	Spanish	Noun	Angina: Dolor o molestia en el pecho que ocurre cuando el músculo cardíaco no recibe suficiente sangre rica en oxígeno.
English	Spanish	Noun	Arteriosclerosis: Engrosamiento y endurecimiento de las paredes arteriales, lo que puede restringir el flujo sanguíneo.

English	Spanish	Noun	Artritis: Inflamación de una o más articulaciones, causando dolor y rigidez.
English	Spanish	Noun	Bacterias meningocócicas agudas: Infección bacteriana grave que afecta las membranas que rodean el cerebro y la médula espinal.
English	Spanish	Noun	Boeing 707: Avión comercial de reacción desarrollado por Boeing en la década de 1950.
English	Spanish	Noun	Conciencia cuántica: Concepto que relaciona la física cuántica con la conciencia humana; no tiene una definición estándar en la medicina convencional.
English	Spanish	Noun	Cúmulos bacterianos: Agrupaciones de

			bacterias que pueden formar biopelículas, estructuras que les permiten adherirse a superficies y resistir tratamientos.
English	Spanish	Noun	Diabetes: Enfermedad crónica que afecta la forma en que el cuerpo convierte los alimentos en energía, caracterizada por niveles elevados de glucosa en sangre.
English	Spanish	Noun	Electrón: Partícula subatómica con carga negativa que orbita el núcleo de un átomo.
English	Spanish	Noun	Equilibrio fisiológico: Estado de balance en el que el cuerpo mantiene sus funciones internas dentro de rangos normales; también conocido como homeostasis.
English	Spanish	Noun	Fotón: Partícula elemental de luz y

			otras formas de radiación electromagnética, que tiene energía, pero no masa.
English	Spanish	Noun	Ganglios linfáticos: Pequeñas estructuras en forma de frijol que forman parte del sistema linfático y ayudan a combatir infecciones filtrando sustancias extrañas.
English	Spanish	Noun	Hemoglobina: Proteína en los glóbulos rojos que transporta oxígeno desde los pulmones a los tejidos del cuerpo.
English	Spanish	Noun	Hipotálamo: Región del cerebro que regula funciones corporales esenciales como la temperatura, el hambre y el sueño.
English	Spanish	Noun	Homeostasis: Capacidad del organismo para mantener un ambiente interno

			estable a pesar de los cambios externos.
English	Spanish	Noun	Inteligencia celular: Término que sugiere que las células tienen la capacidad de 'tomar decisiones' basadas en señales internas y externas; no es un concepto ampliamente reconocido en la biología convencional.
English	Spanish	Noun	Materia cuántica: Estudio de sistemas físicos donde los efectos de la mecánica cuántica son significativos; incluye fenómenos como la superposición y el entrelazamiento.
English	Spanish	Noun	Meditación trascendental: Técnica de meditación que implica el uso de un mantra para promover un estado

			de relajación profunda y reducir el estrés.
English	Spanish	Noun	Melanoma: Tumor en las células pigmentarias que contienen melanina.
English	Spanish	Noun	Omoplastos: Huesos planos y triangulares en la parte superior de la espalda; también conocidos como escápulas.
English	Spanish	Noun	Osteoporosis: Enfermedad que debilita los huesos, haciéndolos frágiles y más propensos a fracturas.
English	Spanish	Noun	Placa: Acumulación de sustancias, como grasa, colesterol y otras, en las paredes internas de las arterias, lo que puede restringir el flujo sanguíneo.
English	Spanish	Noun	Problemas cardíacos: Término general que se refiere a diversas afecciones que

			afectan el corazón, como enfermedad coronaria, insuficiencia cardíaca y arritmias.
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*Table 3 Glossary of the most relevant terminology found in the texts. Source Researcher's creation*

#### 5.1.4

In the text analysis both texts share several similarities in their style and function. Both are classified as "Debate," indicating that they explore ideas in depth. While Perfect Health fulfills an informative and vocative function, encouraging the reader to reflect or act, Lipids, Lipoproteins, and Atherogenesis are purely informative, focusing solely on providing fact-based knowledge, both texts are formal and technical, using specialized terminology. In addition, the emotional tone of both texts is factual, presenting objective information without expressing emotions or subjective views. The difference between the two texts lies in the vocative function of Perfect Health, which can encourage a more interactive engagement with the reader, as opposed to the purely informative nature of "Lípidos, Lipoproteínas y Aterogénesis". In the case of color coding, it showed that literal translation and modulation were the most used techniques in the translation of "Lípidos, Lipoproteínas y Aterogénesis" and "Perfect Health". In "Lípidos, Lipoproteínas y Aterogénesis", literal translation was crucial to preserve the scientific accuracy of terms such as "lipoproteins" and "atherogenesis", while modulation helped to adapt complex ideas to improve readability. In the case of "Perfect Health", modulation was also key to rephrasing specific terms and literal translation was crucial to preserve the message of the text.



## **Chapter VI**

### **Conclusions and Recommendations**

#### **6.1 Purpose of the Conclusion**

This chapter aims to provide a general summary of the research results, evaluate the effectiveness of the translation techniques applied, and reflect on the overall importance of this research within the field of translation. In particular, the degree to which the research objectives were met will be evaluated; in addition, this chapter will offer recommendations for future translators. Moreover, to conclude this research, it is essential to appreciate not only the specific results but also the broader implications these findings have for translators. The translation of medical and health-related materials is a major challenge due to the complexity of the terminology and the need for accurate communication. Therefore, this chapter aims to present an overview of the experiences gained from a practical perspective that can be used as a guide for future translators. In conclusion, this chapter is not only the culmination of the results of this research but also an introduction to the dialog in the field of translation. Moreover, it aims to encourage research on expanding techniques and methodologies that can improve knowledge transmission despite language barriers.

#### **6.2 Conclusions**

### **6.2.1 To translate the texts “Lípidos, Lipoproteínas y Aterogénesis” and “Perfect Health” to effectively achieve coherent and accurate target texts.**

Based on the analysis and application of the translation techniques, the objective was successfully achieved. The translation process demonstrated the importance of using specialized methodologies to ensure accuracy and adaptation, especially in the field of medical and health texts. The application of semantic translation facilitated the preservation of meaning while making the content accessible to the target audience.

In addition, research emphasizes that effective medical translation requires not only strong linguistic competence but also a thorough understanding of medical and health terminology; therefore, to understand the meaning and various aspects of a text, it is essential to read it several times. Reading a text only once often limits the ability to appreciate the themes and details, as well as the context. Neglecting these factors can compromise the accuracy of translations and lead to misinterpretations that could have serious repercussions. By applying specialized translation techniques, this research focuses on the importance of an effective translation process; furthermore, an emphasis on accuracy and clarity is essential to ensure that vital technical information is accurately conveyed and understood by diverse audiences.

### **6.2.2 To apply translation techniques for medical terminology and patient-oriented language within the documents as a way of rendering a coherent and precise target text.**

The second objective focused on the application of medical terminology and patient-oriented language translation techniques. The results revealed that techniques such as transposition, modulation, and literal translation play a crucial role in the adaptation of medical texts to ensure clarity and consistency. Transposition made it possible to introduce structural changes in sentences without altering the meaning, which made certain terms and other parts of

the text more accessible to the target audience. Modulation was especially useful for adapting expressions that required a change of perspective to maintain naturalness in the target language. Furthermore, literal translation was effective in translating precise technical terms and being faithful to the original texts, yet a few parts were supplemented with explicitness to provide clarity when direct equivalents were insufficient.

### **6.2.3 To evaluate the translations' effectiveness in terms of accuracy and readability.**

The third objective was to examine how different translation techniques influence the clarity and coherence of specialized medical and health texts, and therefore, the effectiveness of the texts. The results showed that when the right techniques are used, translated texts achieve a balance between accuracy and readability. Thus, this study highlights the importance of carefully selecting strategies to ensure that medical information is not only accurate but also accessible to a wide audience.

In specialized translation, the complexity of terminology and concepts often presents translators with considerable challenges. Therefore, employing the right techniques is essential not only to achieve accuracy in translated texts, but also to make this information understandable to a wide audience. In addition, the study emphasizes that specialized language must be translated in a way that preserves its meaning.

To assess translation effectiveness, tools such as color coding were used to visually represent the application of the different translation techniques. This approach not only highlighted which techniques were used but also allowed for easy comparison of their impact on the overall clarity and coherence of the text. By assigning specific colors to the different strategies, it was easier to identify patterns in the translation process and to assess how effectively each technique contributed to achieving a balance between accuracy and readability.

#### **6.2.4 To develop a glossary of essential medical and holistic health terms found in both texts ensuring terminological consistency.**

The final objective was to create a glossary of terms related to holistic medicine and health. This goal was successfully achieved by compiling a list of complex terms, ensuring that readers can engage with the texts without encountering difficulties in understanding certain words. As a result, the glossary constitutes a valuable resource for future translation projects in similar fields.

Additionally, the glossary serves not only as a useful tool for translators who wish to maintain terminological consistency between different texts but also as an educational resource for those who wish to deepen their knowledge of scientific and medical texts. By defining difficult terminology, the study aims to facilitate clearer communication and contribute to a more effective transfer of knowledge in this important field. Ultimately, the glossary represents a significant step towards more clarity and understanding in the translation of specialized texts related to medicine and science.

### **6.3 Restatement of the Research Question**

**How can translation techniques be used to improve the accuracy and readability of medical and holistic health texts, with a particular focus on 'Lípidos, Lipoproteínas y Aterogénesis' and 'Perfect Health' by Deepak Chopra, to ensure effective communication across languages in healthcare settings?**

The research question was successfully answered by the study, clearly focusing on the evaluation of the impact of various translation techniques on the medical and health texts "Lipids, Lipoproteins and Atherogenesis" and "Perfect Health". The results revealed significant

improvements in both the accuracy and readability of the translated materials, highlighting the effectiveness of the methodologies employed, using a variety of translation techniques such as transposition, modulation, and literal translation, among others, to achieve these results.

Each of these methods played a crucial role in facilitating the process of translating complex terminology and medical concepts. Furthermore, the study illustrates how these translation techniques can resolve the linguistic differences that often exist between the source and target language. By employing these methods, the translation process not only preserved the meaning of technical medical terms but also made the text more accessible to a wider audience, including healthcare professionals, students, the scientific community, and anyone else who wants to read it.

#### **6.4 Unexpected Results**

One of the unexpected issues that arose during this research was the difficulty of translating certain technical terms into the target language. Some words or phrases, especially those specific to the field of medicine and science, had to be given special detail to be adapted to the target language.

#### **6.5 Recommendations**

Based on the results of this study, some recommendations are proposed for future translators working with medical and health texts.

Careful reading of the original text: Before translating, it is essential to carefully read the original text to understand the context. This includes looking for subtle meanings or aspects that may affect the translation and considering any specific cultural or technical references that need to be adapted.

Researching unfamiliar words: translators should take the time to thoroughly research terms or expressions that are unfamiliar to them or lack a direct equivalent in the target language. This may involve consulting specialized dictionaries or databases to ensure that the correct meaning is conveyed.

Search for other glossaries: As in the previous recommendation, the use of glossaries is highly recommended when translating difficult or unfamiliar terms. These resources can be enormously beneficial, especially when faced with challenges such as uncertainty about how to accurately translate a specific term. By consulting established glossaries, translators can access definitions, contextual understandings, and standard translations that can clarify meanings and ensure terminological consistency in their work. This practice not only helps overcome translation obstacles but also enriches the translator's vocabulary and understanding of specialized language.

Careful selection of translation techniques: Translators must be careful about the translation techniques they use, as each technique can have a significant impact on the accuracy and readability of the text. Translators should research and evaluate where each technique (such as transposition, modulation, or literal translation) should be applied, depending on the context of the text and the intended audience. For example, while literal translation may be effective for certain technical terms, modulation may be necessary to adapt expressions for clarity and naturalness in the target language. Knowing when and where to apply these techniques ensures that the translation maintains both accuracy and clarity.

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## Anex

### CAPÍTULO 1. LÍPIDOS

#### INTRODUCCIÓN

Los lípidos son un grupo muy heterogéneo de moléculas orgánicas; e incluyen grasas, aceites, esteroides, ceras y otros compuestos relacionados más por sus propiedades físicas que por sus propiedades químicas.

El término lípido se aplica a todo compuesto que tiene la propiedad común de ser relativamente insoluble en el agua y soluble en solventes no polares, como el éter, el cloroformo y la acetona.

En su mayor parte, los lípidos consisten de grupos no polares (en general con un alto contenido de carbono e hidrógeno), lo que permite explicar sus características de solubilidad en el agua. Por otro lado, hay algunos lípidos que son más complejos, los cuales contienen grupos no lipídicos, como sulfatos, fosforilos o amino.

Químicamente, los lípidos son biomoléculas que al ser sometidas a hidrólisis producen ácidos grasos y alcoholes complejos que se pueden combinar con los ácidos grasos, formando ésteres.

#### CLASIFICACIÓN

Según su naturaleza química, los lípidos se pueden clasificar en dos grupos o clases principales. Un grupo, que consta de compuestos de cadena abierta con cabezas o grupos polares y largas colas hidrocarbonadas no polares, que incluye a los ácidos grasos, los triacilglicéridos o triglicéridos, los esfingolípidos, los fosfoacilgliceroles y los glucolípidos; y otro grupo que consta de compuestos con anillos fusionados, conocidos como esteroides.

Otra clasificación divide a los lípidos en:

1. **Lípidos simples:** ésteres de ácidos grasos con diversos alcoholes (grasas y ceras).
2. **Lípidos complejos:** ésteres de ácidos grasos que contienen otros grupos además de un alcohol y un ácido graso (fosfolípidos, glucolípidos y otros lípidos complejos).
3. **Lípidos precursores y derivados:** comprenden ácidos grasos, glicerol, esteroides, cuerpos cetónicos, hidrocarburos, vitaminas liposolubles y hormonas liposolubles.

#### Ácidos grasos

Los ácidos grasos son los lípidos más sencillos. Estos son ácidos carboxílicos con cadenas hidrocarbonadas de cuatro a 36 carbonos de longitud. En algunos de ellos la cadena hidrocarbonada es lineal (no ramificada) y saturada (sin dobles enlaces), mientras que en otros la cadena contiene uno o más dobles enlaces.

En general, existe un patrón en la localización de los dobles enlaces; en la mayoría de los ácidos grasos monoinsaturados estos se localizan entre los carbonos 9 y 10, mientras que en los ácidos grasos poliinsaturados se localizan en los carbonos 12 y 15. Casi todos los dobles enlaces tienen una configuración *cis*.

Los ácidos grasos más frecuentes tienen un número par de átomos de carbono en una cadena lineal de 12 a 24 carbonos. El número par es consecuencia de la síntesis de los ácidos grasos, realizada a partir de la adición sucesiva de unidades de dos átomos de carbono.

En lo que respecta a las propiedades físicas de los ácidos grasos, y de los compuestos que los contienen, cabe destacar que estas se encuentran determinadas en gran medida por la longitud y el grado de insaturación de la cadena hidrocarbonada. Las cadenas hidrocarbonadas no polares explican la pobre solubilidad de estos compuestos en el agua. Entre mayor sea la longitud de dicha cadena, menor es la solubilidad en el agua. En el caso de los ácidos grasos de cadena corta, la poca solubilidad en el agua es aportada por el grupo ácido carboxílico.

En los mamíferos, los ácidos grasos en el plasma circulan en la sangre unidos a la albúmina, debido a su pobre solubilidad, y dentro de las células están asociados a proteínas transportadoras o almacenados en gotas lipídicas sin contacto con el medio acuoso.

Por otra parte, al igual que la solubilidad, los puntos de fusión también están influenciados por la longitud y el grado de insaturación de la cadena hidrocarbonada. Las diferencias en los puntos de fusión entre los diversos ácidos grasos se deben a los distintos grados de empaquetamiento de estas moléculas. En un compuesto completamente saturado, las moléculas se empaquetan fuertemente con los átomos en una disposición cristalina, a lo largo de las cadenas, estableciendo contactos de vander Waals con los átomos de las moléculas vecinas. En las moléculas insaturadas, el doble enlace *cis* crea una curvatura en la cadena hidrocarbonada. Los ácidos grasos con una o más curvaturas no pueden empaquetarse juntos o de forma tan estrecha como lo hacen los compuestos saturados, y sus interacciones con otros grupos son más débiles. Como se requiere menos energía térmica para desordenar esta disposición de los ácidos grasos insaturados, ellos tienen puntos de fusión menores que los compuestos saturados con la misma longitud de la cadena.

## Fosfolípidos

Otra clase de lípidos son los llamados fosfolípidos, los cuales se derivan del ácido fosfatídico. En general, hay dos clases de fosfolípidos: los que tienen glicerol como base (fosfoglicéridos) y los que tienen esfingosina como molécula base (esfingolípidos).

Independientemente del tipo, todos los fosfolípidos tienen como característica que son moléculas anfipáticas, con un extremo o cabeza polar hidrofílica y una larga cola hidrocarbonada hidrofóbica. Esta característica permite que una misma molécula tenga una porción soluble en agua (la parte polar o hidrofílica) y otra insoluble en agua (la parte hidrofóbica). Esta propiedad desempeña un papel fundamental para la formación y la estabilidad de las membranas biológicas.

### *Fosfoglicéridos*

Los fosfoglicéridos constituyen el principal grupo de fosfolípidos; estos tienen dos ácidos grasos unidos al primero y segundo carbono del glicerol y poseen un grupo cargado o altamente polar unido al tercer carbono (grupo fosfato). Estos compuestos son nombrados de acuerdo al alcohol polar unido al grupo fosfato asociado al tercer carbono del glicerol. De tal forma, los fosfolípidos fosfatidilcolina y fosfatidilserina tienen colina y serina unidos a su grupo fosfato polar, respectivamente. Entre los fosfoglicéridos también pueden citarse el fosfatidilinositol y la fosfatidiletanolamina.

### *Esfingolípidos*

Los esfingolípidos, en lugar de tener glicerol, poseen un aminoalcohol de cadena larga llamado esfingosina. El esfingolípidos más sencillo es la ceramida, un ácido graso unido a la esfingosina, por medio de un enlace amida.

Cuando se une una molécula de ácido fosfórico y otra de colina a la ceramida, mediante un enlace éster, se origina la esfingomielina, un constituyente importante de la mielina de las fibras nerviosas.

### **Colesterol**

El colesterol es una molécula lipídica encontrada exclusivamente en los animales y en los seres humanos, aunque todo organismo viviente contiene esteroides de diferente tipo.

El colesterol es un alcohol sólido de alto peso molecular y tiene como estructura base al ciclopentanoperhidrofenantreno, una molécula tetracíclica de 17 carbonos. A partir de esta molécula base se adicionan un grupo polar hidroxilo y 10 átomos de carbono, para dar una molécula de 27 átomos de carbono y un grupo polar hidroxilo en su átomo de carbono número 3 (Figura N° 1).

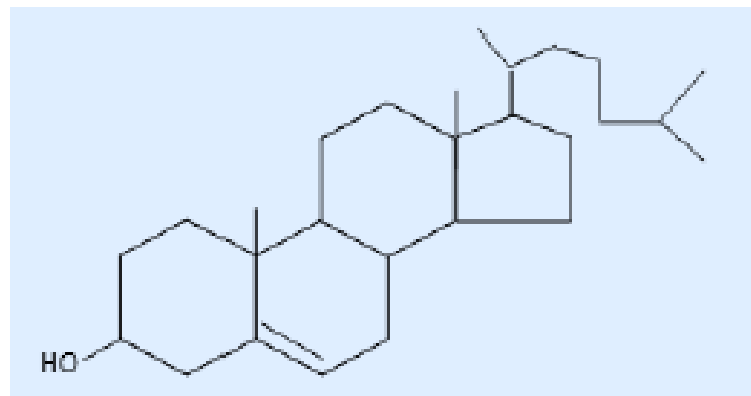


Figura N° 1. Molécula de colesterol. Nótese su estructura base de cuatro anillos.

## FUNCIONES

### Fuente de energía

La función más conocida de los lípidos es servir como fuente de energía. Los ácidos grasos cuando son oxidados dentro de la célula liberan la energía necesaria para llevar a cabo diversos procesos biológicos: síntesis de moléculas, transporte de sustancias a través de las membranas y movimiento o trabajo mecánico.

Debido a que los ácidos grasos dentro de la célula son tóxicos, por su efecto detergente, su almacenamiento celular se realiza en forma de triglicéridos, en gotas lipídicas, para neutralizar dicho efecto.

Los triglicéridos son moléculas no polares, insolubles en el agua y químicamente consisten en la unión éster de tres ácidos grasos al glicerol. A nivel tisular, el gran depósito de estos compuestos constituye el tejido adiposo, donde también sirven de aislante térmico de los tejidos subcutáneos y alrededor de ciertos órganos.

Es importante destacar que aunque la mayoría de las células pueden almacenar triglicéridos, solo los adipocitos los almacenan en cantidades significativas y dispuestos para su utilización por otros tejidos.

### *Gotas lipídicas o LDs*

Como se mencionó, los triglicéridos se almacenan en gotas lipídicas intracelulares (LD, del inglés "*lipid droplet*"). Este almacenamiento causa la expansión del tejido adiposo, lo cual se produce como una respuesta adaptativa a la sobrenutrición, que puede prevenir la acumulación ectópica lipídica y la lipotoxicidad en otros tejidos.

Las LDs también almacenan ésteres de colesterol y vitaminas liposolubles. Además, proveen bloques de construcción para las membranas o sustratos para el metabolismo energético, y sirven como centros organizadores para la síntesis de lípidos específicos, como los triglicéridos.

En general, casi todas las células tienen la capacidad de sintetizar LDs, cuyo número y tamaño varían de manera significativa en los diversos tipos celulares o entre las células individuales. De tal forma, muchas células tienen LDs pequeñas, de 100-200 nm de diámetro, mientras que las LDs del tejido adiposo poseen un diámetro de hasta 100  $\mu\text{m}$  y llenan casi todo el citoplasma. El tamaño de estas partículas puede cambiar en corto tiempo, según las condiciones existentes: durante los periodos de lipogénesis las gotas lipídicas crecen rápidamente y se reducen durante los periodos de escasez de nutrientes.

En lo que respecta a su estructura, las LDs están conformadas por una monocapa de fosfolípidos superficiales, la cual deriva del retículo endoplásmico. Esta monocapa rodea un centro constituido por lípidos neutros, principalmente triglicéridos y ésteres de colesterol, aunque su cantidad relativa varía según el tipo celular. Por ejemplo, las LDs de los adipocitos contienen mayoritariamente triglicéridos y las de los macrófagos ésteres de colesterol. En estas organelas también pueden encontrarse otros lípidos hidrofóbicos, como las vitaminas lipídicas y los isoprenoides de cadena larga.

Además de lípidos, las LDs tienen proteínas en su superficie. En las LDs de los mamíferos predominan las proteínas de la familia PAT, cuyos miembros más estudiados son las proteínas PLIN o perilipinas, debido a que son las principales proteínas asociadas a estas partículas. Las PLIN regulan el acceso de las lipasas a los lípidos neutros del corazón de las gotas lipídicas; de esta manera, controlan la homeostasis de los lípidos. La proteína PLIN1 es fundamental para el control de la hidrólisis de los triglicéridos presentes en las LDs.

Aparte de las proteínas de la familia PAT, hay otros grupos de proteínas asociadas a las LDs (1), con una gama amplia de funciones: señalización celular, metabolismo energético, proteínas para el tránsito hacia la membrana, chaperones, entre otras. Muchas de ellas son catalogadas como "proteínas refugiadas", pues no parecen ser relevantes para el funcionamiento de estas estructuras lipídicas.

### *Hidrólisis*

La utilización de los ácidos grasos requiere su separación del glicerol a partir de los triglicéridos, por un proceso de hidrólisis. Esta hidrólisis requiere de la acción secuencial de la lipasa adipocítica de triglicéridos (ATGL, del inglés "*adipose triglyceride lipase*") para hidrolizar estos compuestos a diacilglicerol (DAG) y un ácido graso; de la lipasa sensible a hormonas (HSL del inglés "*hormone-sensitive lipase*") para hidrolizar el DAG a monoacilglicerol y otro ácido graso; y de la enzima monoacilglicerol lipasa para obtener el glicerol y otro ácido graso. Todo este proceso secuencial de la hidrólisis genera ácidos grasos y glicerol.

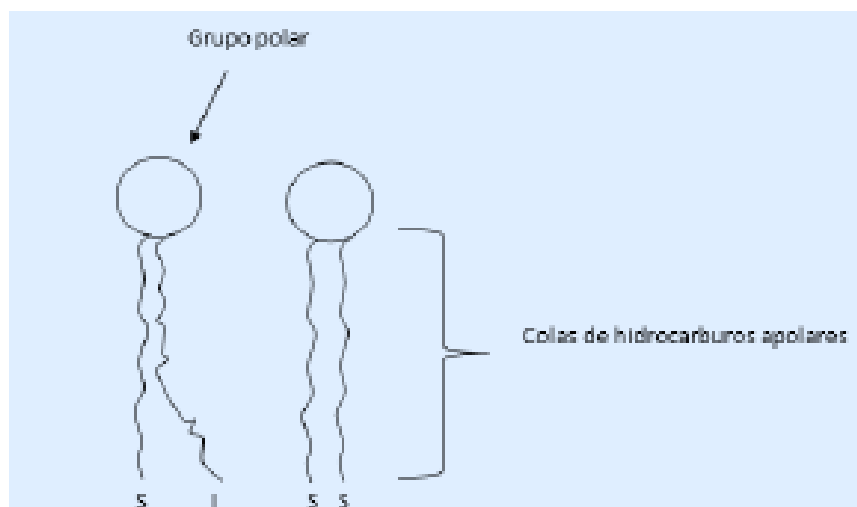
En condiciones basales, PLIN1 parece reducir la lipólisis, uniéndose a la proteína CGI-58, un activador de la ATGL. La activación de la proteína quinasa A (PKA) por acción hormonal fosforila a PLIN1 y libera a CGI-58, y le permite unirse a la ATGL. Entonces, aumenta la actividad de la ATGL sobre los triglicéridos de la LD. Además, la PKA fosforila a la enzima HSL y le permite unirse a la LD para ejercer su acción hidrolítica.

En ausencia de la PKA, la HSL está localizada en su mayoría en el citoplasma. En las células no estimuladas, CGI-58 se halla unida a la PLIN1 asociada a LD y no puede ejercer su actividad estimuladora de la ATGL. Con la activación, PLIN1 es fosforilada y libera a CGI-58.

Los ácidos grasos liberados a través de este proceso pueden seguir varias rutas: ser reesterificados nuevamente; usados para obtener energía mediante el proceso llamado  $\beta$  oxidación; empleados como bloques de construcción para la síntesis de lípidos de membrana; servir como cofactores para la señalización celular; o ser exportados.

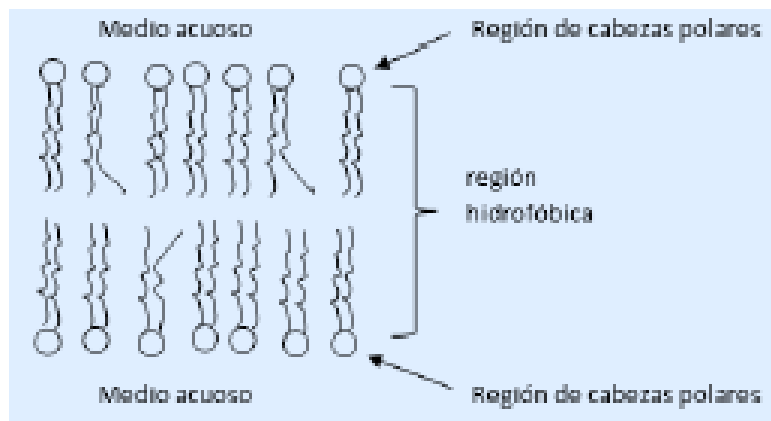
## Membranas biológicas

Otra función igualmente importante de los lípidos es la de ser constituyentes de las membranas biológicas o plasmáticas. La estructura básica de estas membranas es una bicapa lipídica formada por fosfolípidos. Estas moléculas tienen un carácter anfipático, poseen una región polar, hidrofílica (la cabeza), y otra no polar, hidrofóbica o lipofílica (las dos colas) (Figura N° 2). Esta característica hace posible que los fosfolípidos interactúen de manera simultánea con sustancias polares y no polares. Además, esta propiedad les permite constituirse en las moléculas claves de las membranas celulares.



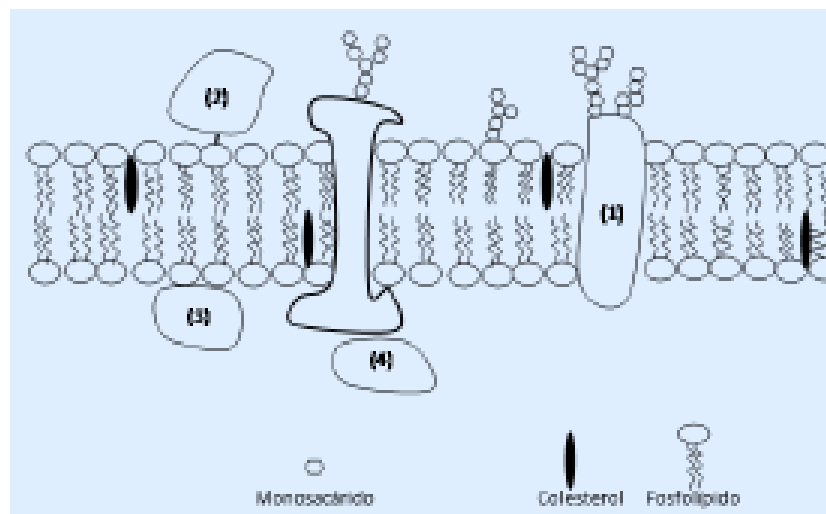
**Figura N° 2.** Representación esquemática de un fosfolípido. El grupo de cabeza polar es hidrofílico y las colas son hidrofóbicas. Los ácidos grasos en las colas están saturados (S) o insaturados (I). Normalmente, los ácidos grasos saturados están unidos al carbono 1 del glicerol y los insaturados al carbono 2. Fuente: Murray RK, Bender DA, Botham KM, Rodwell VW, Weil PA (editores). *Harper Bioquímica ilustrada*. 28 ed. México DF: McGraw Hill; 2010.

En una solución acuosa, los fosfolípidos tienden a formar espontáneamente bicapas, con la región polar orientada hacia el exterior, en contacto con la fase acuosa a ambos lados, y la región no polar orientada hacia el interior, formando el centro hidrofóbico de la bicapa, y alejada del agua (Figura N° 3). Las regiones no polares de los lípidos se agrupan entre sí a través de interacciones hidrofóbicas. Estas interacciones se fortalecen reduciendo el número de moléculas de agua que rodean a la región de las colas hidrofóbicas y alcanzan estabilidad termodinámica, permitiendo la formación de bicapas lipídicas.



**Figura N° 3.** Diagrama de la disposición de los fosfolípidos formando una bicapa lipídica. Las colas de los ácidos grasos crean una región central hidrofóbica, oculta del agua, mientras que las cabezas polares forman dos zonas hidrofílicas en contacto con el medio acuoso. La presencia de ácidos grasos insaturados disminuye el empaquetamiento de la membrana, aumentando la fluidez de esta. Fuente: Murray RK, Bender DA, Botham KM, Rodwell VW, Weil PA (editores). *Harper Bioquímica ilustrada*. 28 ed. México DF: McGraw Hill; 2010.

Las proteínas también forman parte de dicha estructura; de hecho, constituyen alrededor de la mitad de la masa de la membrana plasmática. Algunas sobresalen de la membrana por alguno de los dos lados y otras sobresalen por ambos lados (Figura N° 4). Por lo general, las partes extracelulares de los lípidos y de las proteínas están frecuentemente glicosiladas.



**Figura N° 4.** Diagrama esquemático de la estructura básica de la membrana plasmática. A la bicapa lipídica de fosfolípidos se adicionan moléculas de colesterol y proteínas. Las proteínas pueden atravesar la membrana (1), anclarse a lípidos de la membrana (2) o asociarse periféricamente con la membrana por atracciones electrostáticas (3). Además, pueden darse interacciones proteína-proteína del lado citosólico (4) o extracelularmente (no mostrado). Los lípidos de la cara externa y los dominios proteicos extracelulares pueden estar glicosilados. Fuente: de la Serna JB, Schütz GJ, Eggeling C, Cebecauer M. There is no simple model of the plasma membrane organization. *Front Cell Dev Biol*. 2018; 4: 108.

La orientación de las proteínas en la bicapa no es homogénea, originando una asimetría; de tal forma, los dos lados o capas de la membrana son diferentes entre sí, tanto en composición como en función. A la vez, existe otra asimetría originada por un

movimiento desigual de cargas eléctricas a través de la membrana, dando lugar a un potencial eléctrico. Esta asimetría de cargas permite un número de procesos celulares vitales para la célula. Aun en la ausencia de iones, la distribución asimétrica de los lípidos en la bicapa puede generar un potencial de membrana.

Los investigadores Trimble y Grinstein (2) mencionan diversos mecanismos celulares capaces de generar y mantener la asimetría en las membranas biológicas. Entre ellos pueden citarse: la presencia de uniones estrechas entre las células adyacentes; el transporte activo de moléculas que origina una concentración diferencial de componentes; la asociación de proteínas de membrana con proteínas del citoesqueleto, con el retículo endoplásmico o con moléculas de la matriz extracelular; la repulsión o atracción eléctrica entre proteínas móviles de la membrana; las agrupaciones de proteínas que dificultan o bloquean el paso de componentes móviles de la membrana; la presencia de microdominios dentro de la membrana; entre otros.

Según su localización o interacción con la bicapa lipídica, se reconocen tres tipos de proteínas:

- 1) Proteínas integrales, asociadas fuertemente a la membrana por medio de interacciones hidrofóbicas entre los lípidos de la membrana y los dominios hidrofóbicos de las proteínas.
- 2) Proteínas periféricas, asociadas en forma más débil a la membrana, por medio de enlaces iónicos y de hidrógeno entre los dominios hidrofílicos de las proteínas y los grupos polares de los lípidos de la membrana.
- 3) Proteínas anfitrópicas, encontradas en el citosol y en asociación con la membrana. La interacción de las proteínas de membrana con las moléculas lipídicas es crítica para su estabilidad y plegamiento.

En el caso de los fosfolípidos, se encuentran en la membrana plasmática cuatro principales: fosfatidilcolina (PC), fosfatidiletanolamina (PE), fosfatidilserina (PS) y esfingomielina (SM). La capa u hoja externa de la membrana plasmática consiste esencialmente de PC y SM, mientras que la PE y la PS son los fosfolípidos predominantes en la capa interna, donde también se localiza un quinto fosfolípido, el fosfatidilinositol. A parte de esos fosfolípidos, la membrana contiene glicolípidos y colesterol. Este último puede representar hasta el 40 % del total de los lípidos.

La relación proteína-lípido en las membranas celulares es aproximadamente de 1:40. Esta relación puede variar de manera significativa según el tipo celular. Por lo general, las membranas metabólicamente activas son más ricas en proteínas.

### *Flexibilidad y fluidez*

Los diferentes cambios en la composición de los ácidos grasos de los fosfolípidos resultan en cambios en las propiedades fisicoquímicas de la bicapa, tales como la flexibilidad y la fluidez. En la mayoría de los casos, los fosfolípidos tienen un ácido

graso saturado en la posición 1 y uno insaturado en la posición 2 del glicerol. Los dobles enlaces en los ácidos grasos están en configuración *cis*, produciendo una torsión en la cadena hidrocarbonada. Esta torsión ocasiona que estos ácidos en la membrana no se empaquen tan estrechamente, como sí ocurre con los ácidos grasos saturados, produciendo agregados o estructuras fluidas y flexibles.

### *Flexibilidad*

A nivel visual, los dos ácidos grasos de una molécula de fosfolípido semejan una forma cilíndrica, con un área de superficie denominada como "A". La insaturación comparada con la saturación resulta en un valor mayor de A. El cambio de cadenas acilo saturadas por cadenas *cis* mono o poliinsaturadas en un modelo de membrana incrementa el área (A) por aproximadamente 15 %, lo que implica un aumento en la distancia entre las cadenas hidrocarbonadas. Debido a que las fuerzas atractivas de van der Waals disminuyen en  $1/r^6$ , el incremento en la distancia entre las cadenas hidrocarbonadas reduce esta fuerza atractiva intermolecular entre las cadenas de ácidos grasos, ocasionando una mayor flexibilidad de la membrana y una menor rigidez.

La flexibilidad de la membrana (determinada mediante el índice de insaturación) permite que ciertos lípidos puedan deformar la estructura plana de la bicapa mediante torsiones, cambiando su curvatura. Esto permite los procesos de endo/exocitosis, que son iniciados por una torsión de la membrana inducida por proteínas y por la hidrólisis de ATP/GTP. Cabe destacar que la membrana plasmática tiene la capacidad de formar extensiones especializadas con una gran curvatura para cumplir funciones específicas; por ejemplo, la formación de microvilli en los enterocitos para una captación eficiente de nutrientes o de nanotubos de membrana para la comunicación intercelular. Un fenómeno estrechamente relacionado es el efecto del grado de insaturación de la bicapa sobre la tensión superficial. Un fuerte empaquetamiento de la cadena hidrocarbonada asegura una mínima exposición del interior hidrofóbico con el agua, ocasionando una tensión de membrana positiva, que tiende a contraer la bicapa. La presencia de ácidos grasos *cis* insaturados decrece el empaquetamiento fuerte y consecuentemente decrece la tensión de membrana positiva.

### *Fluidez*

En general, la membrana es fluida, pues la mayoría de las interacciones entre sus componentes son no covalentes, permitiendo a las proteínas y a los lípidos un movimiento lateral, en el mismo plano o eje longitudinal de la membrana.

Además, la membrana plasmática está en continuo movimiento, creando una estructura dinámica. En este punto es importante mencionar que el término "fluidez" para las membranas biológicas es similar al término "viscosidad" y depende de la composición de la membrana. La presencia de proteínas integrales de membrana incrementa la viscosidad local, en su inmediata vecindad, reduciendo la movilidad de los constituyentes de la membrana.

En los ácidos grasos saturados, la organización lineal de las colas hidrocarbonadas hace que las moléculas queden estrechamente empaquetadas en la bicapa lipídica de la membrana, por lo que hay una menor fluidez. En los ácidos grasos insaturados, hay una flexión o curvatura que genera una estructura más abierta; menos empaquetada. La estructura desordenada originada por la presencia de ácidos grasos insaturados con dobles enlaces *cis* y, por tanto, con cadenas hidrocarbonadas flexionadas, hace que la bicapa tenga una mayor fluidez.

Ante la presencia de colesterol, el orden y la rigidez de la membrana pueden verse incrementados.

Se debe tener presente que los componentes lipídicos siempre están en movimiento, en mayor grado en las bicapas más fluidas y en menor grado en las más rígidas. Hay muy poca tendencia de las moléculas lipídicas para migrar de una capa a otra capa de la bicapa lipídica, aunque esto ocurre ocasionalmente. En contraste, el movimiento lateral de las moléculas lipídicas dentro de la misma monocapa es frecuente, sobre todo en las capas más fluidas.

Con el calor las bicapas se vuelven menos ordenadas, las bicapas ordenadas se vuelven menos ordenadas y las que son relativamente desordenadas se desordenan aún más. Esta transición se da a una temperatura característica, siendo más alta para las membranas que cuentan con mayor orden y rigidez, y más baja para las membranas relativamente fluidas y desordenadas.

### *Balsas lipídicas*

Las cadenas o colas hidrocarbonadas de una capa se interdigitan en el espacio de la otra capa. Este acoplamiento puede ser reducido por el colesterol. Para conocer bien el efecto de este fenómeno de acoplamiento o interdigitación entre las dos capas sobre las propiedades y las funciones de las membranas, se debe tener claro que las membranas delimitan y mantienen la individualidad de la célula y de las organelas. También sirven para almacenar y transducir energía en forma de gradientes electroquímicos. Además, son centros organizadores de funciones tales como el metabolismo y la señalización intracelular, y son estructuras claves en la biología celular.

La membrana no es una estructura homogénea ni azarosa, sino que más bien es altamente asimétrica, con diferente composición de lípidos y proteínas en las dos caras o con capas organizadas, para facilitar funciones celulares específicas.

En la membrana se forman dominios o grupos definidos de lípidos que pueden diferenciarse de su entorno dentro de la misma membrana. Entre estos dominios destacan las balsas lipídicas ("*lipid rafts*"), formadas por la unión o asociación preferencial del colesterol con los esfingolípidos. A estos "*lipid rafts*" pueden asociarse diversas proteínas, por lo que se considera que pueden funcionar como plataformas, enriquecidas en colesterol y esfingolípidos, dentro de la membrana plasmática, para la señalización o internalización de diversos mensajes extracelulares.

Estas plataformas o dominios no deben verse simplemente como maneras de activar o inhibir la actividad de las proteínas incluidas dentro del dominio. El concepto emergente es que la membrana utiliza diversas vías o modos para regular finamente la función de las proteínas, y una de estas maneras es por medio de la creación de dominios a los que se asocian diversas proteínas en una forma específica. Un ejemplo de lo anterior es la asociación de las proteínas Ras con la membrana para diversificar y optimizar sus funciones.

Sezgin y colaboradores (3) indican que el pequeño tamaño y la vida media corta *in vivo* de estos dominios complican la medición directa de sus propiedades en las células vivas. Valga decir que el tamaño y la vida media de estos dominios no son constantes y pueden variar según las circunstancias del momento.

La función más obvia de estos dominios es la de segregar elementos específicos para regular sus interacciones con otros componentes de la membrana y su actividad.

La primera vía de señalización asociada con las balsas lipídicas conocida fue la señalización a través de la inmunoglobulina E (IgE).

### Otras funciones de los lípidos

El colesterol no es solo una molécula presente en las membranas biológicas, también es la molécula base para la síntesis de diversas hormonas (mineralocorticoides, glucocorticoides, estrógenos y andrógenos) implicadas en diferentes acciones del metabolismo.

El ácido araquidónico, un ácido graso de 20 carbonos y cuatro dobles enlaces, es la base para la síntesis de prostaglandinas, leucotrienos y tromboxanos. Entre las funciones de las prostaglandinas están el control de la presión arterial, la estimulación de la contracción del músculo liso y la inducción de la inflamación. Además, inhiben la agregación plaquetaria. Los leucotrienos, por su parte, poseen la capacidad de causar constricción del músculo liso, sobre todo en los pulmones; mientras que los tromboxanos, especialmente el miembro más estudiado, el tromboxano A<sub>2</sub>, causan la agregación plaquetaria y la contracción del músculo liso. También hay lípidos que actúan como segundos mensajeros dentro de las vías de señalización celular, como el diacilglicerol, que funciona como un activador de la protein quinasa C.

A la vez, los lípidos actúan como moléculas reguladoras de la síntesis de algunos compuestos. Un caso muy conocido es el colesterol, que actúa como regulador de su propia síntesis y del principal receptor de membrana encargado de captar a la lipoproteína LDL (LDLR). También los ácidos grasos regulan vías de señalización que controlan la expresión de factores de transcripción o la fosforilación, la ubiquitinación o el corte proteolítico de diversos factores de transcripción. Mediante este control pueden regular la expresión de diversos genes.

Los lípidos no polares, por otra parte, actúan como aislantes eléctricos, lo que permite la propagación rápida de las ondas de despolarización a lo largo de los nervios

# Acknowledgments

I wish to offer my heartfelt thanks

To my family, for their deep love and support, which is the basis for everything I do.

To Barney Sherman, who first organized and clarified a vast body of raw information; without his patient work, this book would not have been launched.

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And to the dedicated family of doctors, nurses, technicians, instructors, and support staff who truly deserve to call the success of Maharishi Ayurveda their own. Each of you has inspired me by living the ideal of perfect health every day. Most especially, I see this ideal personified in Dr. Richard Averbach and Dr. Stuart Rothenberg, the first two physicians in this country to make Maharishi Ayurveda their life's work. Their professional advice at every stage of this book has been invaluable. Thank you, dearest colleagues, for leading the way.

that we, the host of germs, somehow open or close the gate to them. More than 99.99 percent of the time, the gate is closed, which implies that each of us is much closer to perfect health than we realize.

The leading cause of death in the United States is heart disease, which in most cases is caused by deposits of plaque blocking the coronary arteries that conduct oxygen to the heart. When cholesterol and other debris begin to obstruct these arteries, oxygen starvation threatens to impair the heart's function. When the oxygen of heart disease is highly personal. One person with a single, rather small bit of plaque can be incapacitated by angina, the crushing chest pain symptomatic of coronary artery disease. Yet the same person with several deposits of plaque large enough to block most of the oxygen flow to the heart might feel nothing. People whose coronary arteries were 85 percent blocked have been known to run marathons, while others have dropped dead of a heart attack with completely clean vessels. Our physical ability to repel disease is extremely flexible.

In addition to our body's physical immunity, we all have strong emotional resistance to sickness. As one woman, an older patient of mine, put it, "I've read enough psychology to know that a well-adjusted adult is supposed to become reconciled to getting sick, growing old, and eventually dying. At some level I have understood that—but emotionally and instinctively, I don't believe it at all. Getting sick and deteriorating physically seem like a ghastly mistake, and I've always hoped someone would come along to correct it."

This woman is nearly 70 now, and her physical and mental condition is excellent. When asked what lies ahead, she said, "You may think this is crazy, but my attitude is that I'm not going to get old, and I'm not going to die." Is that so unreasonable? People who consider themselves "too busy to get sick" are known to have above-average health, while those who worry excessively about disease fall prey to it more often. Another man told us that the idea of perfect health appealed to him because it was a creative solution—perhaps the only solution—to the overwhelming problems currently facing medicine. A highly successful electronics executive, this man compared perfect health to the kind of "breakthrough thinking" that transforms corporations.

Breakthrough thinking is a unique form of problem solving; it

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# Invitation to a Higher Reality

There exists in every person a place that is free from disease, that never feels pain, that cannot age or die. When you go to this place, limitations which all of us accept cease to exist. They are not even entertained as a possibility.

This is the place called perfect health.

Visits to this place may be very brief, or they may last for many years. Even the briefest visit, however, instills a profound change. As long as you are there, the assumptions that hold true for ordinary existence are altered, and the possibility of a new existence, higher and more ideal, begins to flower. This book is for people who would like to explore this new existence, bring it into their lives, and make it permanent.

The cause of disease is often extremely complex, but one thing can be said for certain: no one has proved that getting sick is necessary. Quite the opposite, in fact. Every day we come in contact with millions of viruses, bacteria, allergens, and fungi, and only the tiniest fraction ever lead to disease. It is not uncommon for doctors to see patients whose respiratory tracts contain clusters of virulent meningococcus bacteria living there harmlessly. Only on rare occasions do they break out and cause meningitis, a serious and at times fatal infection of the central nervous system. What provokes such an attack? No one knows precisely, but it seems to involve a mysterious factor called "control by the host," meaning

years and trained nearly one hundred other physicians in Ayurvedic theory and practice. In adopting Maharishi Ayurveda, I have not abandoned my earlier conventional training but extended it. Blending Maharishi Ayurveda and Western medicine brings together ancient wisdom and modern science—and the two have proved completely compatible. As a doctor, I still take medical histories and work up physicals on my patients, relying on objective tests to tell me when a person is sick; in addition, however, I guide my patients to look inward, to find that all-important balanced awareness inside themselves.

## THE QUANTUM MECHANICAL HUMAN BODY

To comprehend how this is possible, we have to delve deeper into the body itself. In Ayurveda, the physical body is the gateway to what I call the “quantum mechanical human body.” Physics informs us that the basic fabric of nature lies at the quantum level, far beyond atoms and molecules. A quantum, defined as the basic unit of matter or energy, is from 10,000,000 to 100,000,000 times smaller than the smallest atom. At this level, matter and energy become interchangeable. All quanta are made of invisible vibrations—ghosts of energy—waiting to take physical form. Ayurveda says that the same is true of the human body—it first takes form as intense but invisible vibrations, called quantum fluctuations, before it proceeds to coalesce into impulses of energy and particles of matter.

The quantum mechanical body is the underlying basis for everything we are: thoughts, emotions, proteins, cells, organs—any visible or invisible part of ourselves. At the quantum level, your body is sending out all kinds of invisible signals, waiting for you to pick them up. You have a quantum pulse underlying your physical one, and a quantum heart beating it out. In fact, Maharishi Ayurveda holds that all the organs and processes in your body have a quantum equivalent.

The quantum mechanical body would do us very little good if we could not detect it. Fortunately, human awareness is capable of sensing these faint vibrations, thanks to the incredible sensitivity of our nervous system. A single photon of light falling upon the retina of the eye makes far less impact than a single speck of dust

involves making a situation better by first raising your expectations much higher than anyone believes possible and then looking for ways to make your vision come true. "If people continue to think and act in the same familiar ways," this man commented, "they may accomplish five to ten percent improvements by working harder. However, to get improvements of two to ten times, targets must be set high enough that people say, 'Well, if you want *that much* improvement, we'll have to do this an entirely different way.'"

Breakthrough thinking has been applied among advanced computer companies in Silicon Valley—for example, if the current model of some hardware or software took forty-eight months to develop, the next generation is scheduled for twenty-four months. If defects in manufacturing have been cut down to 5 percent, then "zero defects" becomes the rule for the future. That is exactly how perfect health works—it sets zero defects as the goal and then discovers how the goal can be met. In the computer world, it may cost eight to ten times more to repair a defective machine than to make it defect-free in the first place. For that reason, imposing "quality at the source" (i.e., doing things right the first time) makes better business sense than going for engineering that is merely "good enough."

The same is true in medicine, where prevention is much cheaper than treatment, both in human and in economic terms. A 1988 poll shows that more than anything else, Americans fear catastrophic illness. The reason doesn't have to do with pain and suffering—it involves the crushing expense of a long hospital stay and the devastating costs of whatever surgeries and drugs are required. Even death is not as frightening as leaving one's family destitute. Clearly, we need a medical approach that believes in "quality at the source" and can promote it in individuals.

### PROMISE OF A NEW MEDICINE— MAHARISHI AYURVEDA

The first secret you should know about perfect health is that you have to choose it. You can only be as healthy as you think it is possible to be. Perfect health is no mere 5 or 10 percent improvement over good health. It involves a total shift in perspective which makes disease and infirm old age unacceptable.

Can we really believe in "zero defects" for something as complex as the human body? According to the National Institute on Aging, no diet, exercise, vitamin, drug, or lifestyle change has proved itself capable of reliably extending life. Averting the degenerative disorders that afflict the elderly—heart disease, stroke, cancer, arteriosclerosis, arthritis, diabetes, osteoporosis, and so on—is more feasible than ever before but still unlikely. Although in public medical researchers speak optimistically of major breakthroughs in curing cancer and the other major intractable illnesses, they are much more pessimistic among themselves. The best that they hope for is creeping gradualism—taking one tiny step at a time toward a solution. (Lowering cholesterol levels will, statistically, reduce heart attacks in a large group of people, for instance, but it does not guarantee that any single person will be spared.)

To make health twice or ten times better, you need a new kind of knowledge, based on a deeper concept of life. This book presents a unique source of such knowledge, a system of preventive medicine and health care called Maharishi Ayurveda. Dating back in India more than 5,000 years, Ayurveda comes from two Sanskrit root words, *Ayus*, or "life," and *Veda*, meaning "knowledge" or "science." Therefore, Ayurveda is usually translated as "the science of life." An alternate and more precise reading would be "the knowledge of life span."

The purpose of Ayurveda is to tell us how our lives can be influenced, shaped, extended, and ultimately controlled without interference from sickness or old age. The guiding principle of Ayurveda is that the mind exerts the deepest influence on the body, and freedom from sickness depends upon contacting our own awareness, bringing it into balance, and then extending that balance to the body. This state of balanced awareness, more than any kind of physical immunity, creates a higher state of health.

Ayurveda embodies the collected wisdom of sages who began their tradition many centuries before the construction of the Pyramids and carried it forward generation after generation. A modernized system based on their insights—Maharishi Ayurveda—did not come to the West until 1985. It is named after Maharishi Mahesh Yogi, the founder of Transcendental Meditation, who turned his attention to reviving Ayurveda in the early 1980s. I was fortunate to be one of the first M.D.'s to offer this new medicine; I have treated more than ten thousand patients with it in the past five

is about the same as the likelihood that a hurricane could blow through a junkyard and create a Boeing 707.

One of the most crucial changes in contemporary science is the sudden arrival on the scene of models that take intelligence into account as a vital force in the universe. (In physics, for example, there is the so-called anthropic principle, which proposes that the whole of creation since the Big Bang was designed expressly to lead to the existence of man.)

Why is this relevant to us? Because Maharishi Ayurveda, seen in its larger context, is nothing less than a technology for contacting the quantum level inside ourselves. To get there you need special techniques—which we will cover in detail—that allow you to peel away the mask of the physical body; in addition, you have to transcend, or go beyond, the constant activity that fills the mind, like the noise of a radio that cannot be turned off. Beyond that distraction lies a silent region that appears as empty as the quantum field between the stars. Yet, like that quantum field, our inner silence holds rich promise.

The silence inside us is the key to the quantum mechanical body. It is not a chaotic but an organized silence. It has shape and design, purpose and processes, just like the physical body. Instead of seeing your body as a collection of cells, tissues, and organs, you can use the quantum perspective to see it as a silent flow of intelligence, a constant bubbling up of impulses that create, control, and become your physical body. The secret of life at this level is that *anything in your body* can be changed with the flick of an intention.

You may find this hard to believe, so let me offer the example of Timmy, a perfectly ordinary-seeming 6-year-old who suffers from one of the strangest of psychiatric syndromes—multiple personality disorder. Timmy has more than a dozen separate personalities, each with its own emotional patterns, vocal inflections, likes and dislikes. Yet people with multiple personalities are not just psychological cases; as they drop one personality and put on another, remarkable changes can occur in their bodies.

One personality might have diabetes, for example, and the person will be insulin-deficient as long as that personality is in force. Yet the other personalities may be completely free of diabetes, testing normally for insulin levels. Likewise, one personality may have high blood pressure while the others do not; even scars, warts, sores, and other skin blemishes have been seen to appear and disappear with the changing of personalities. The literature on

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block their arteries, Dr. Ornish's group used simple yoga exercises, meditation, and a strict low-cholesterol diet. Why was this finding considered so remarkable? Because mainstream medicine had never before acknowledged that heart disease can be reversed once it has started. Medicine's official position is that a sick artery follows its own course of development: No matter what you believe, think, eat, or do, such arteries relentlessly pursue their grim fate, degenerating a little more every day, eventually becoming blocked and strangulating the heart muscle.

Yet, at the quantum level, *no* part of the body lives apart from the rest. There are no wires holding together the molecules of your arteries, just as there are no visible connections binding together the stars in a galaxy. Yet arteries and galaxies are both securely held together, in a seamless, perfect design. The invisible bonds that you cannot examine under a microscope are quantum in nature; without this "hidden physiology," your visible physiology could not exist. It would never have been more than a random collection of molecules.

Maharishi Ayurveda would say that Ornish's breakthrough for heart disease holds true for any disorder, once you know how to make use of the quantum mechanical body. A deposit of cholesterol-filled plaque looks solid, like rust lining an old pipe, but plaque is alive and changing, just like the rest of the body. New fat molecules drift in and out of it, new capillaries develop to bring in oxygen and food. The real news from Ornish's study is that what we build in our bodies we can also unbuild. A man who dies of a heart attack at age fifty has had innumerable chances to build new arteries. A 70-year-old woman who develops osteoporosis in her spine has had innumerable chances to make a healthy spine. (We cannot really count the chances, since the process of change is constant; however, you could possibly heal a damaged artery or a defective bone in a matter of a few weeks or months.) We are all building new bodies all the time. Why not build a healthy artery, a healthy spine, a complete and healthy person?

In India's ancient Vedic tradition, the most basic force underlying all of nature is intelligence. The universe, after all, is not "energy soup"; it is not mere chaos. The incredibly exact fit of things in our world—above all, the astonishing existence of DNA—argues for an infinite amount of intelligence in nature. As one astrophysicist put it, the likelihood that life was created randomly

falling on a football field. Yet the specialized nerve endings of the retina, the rods and cones, can actually detect a single photon, send a message to the brain, and cause you to see its light. Rods and cones are like giant radio telescopes, huge structures that can still gather signals on the very threshold of physical existence, and then amplify them in such a way that our senses can deal with them directly.

By treating the underlying quantum mechanical body itself, Maharishi Ayurveda can bring about changes far beyond the reach of conventional medicine, confined as it is to the level of gross physiology. This is because the power available at the quantum level is infinitely greater than that found at grosser levels. The explosion of an atom bomb, which is a gigantic quantum event, is but one instance. A more constructive example is the laser, which takes the same light that is emitted by a flashlight, and by organizing it into coherent quantum vibrations boosts its power enough to cut through steel.

What is at work here is the quantum principle, which reveals that the most subtle levels of nature hold the greatest potential energy. The black emptiness of intergalactic space, although a mere vacuum, contains almost inconceivable amounts of hidden energy, enough in every cubic inch to power a star. Only when it makes the quantum leap does this "virtual energy," as it is called, explode into heat, light, and other forms of visible radiation.

We all know that burning a piece of wood releases much less energy than splitting its atoms through a nuclear reaction. But we have ignored the creative side of the same equation—*making* something new at the quantum level would be just as powerful as destroying it. Only nature creates rocks, trees, stars, and galaxies, but we are busily engaged every day in making something arguably far more complex and precious than a star—a human body. Whether we realize it or not, all of us are responsible for creating the body we live in. Headlines were made in the winter of 1988 when a San Francisco cardiologist, Dr. Dean Ornish, proved that forty advanced heart patients could actually shrink the fatty plaque deposits that were progressively blocking their coronary arteries. As the arteries of these patients began to open, fresh oxygen started reaching their hearts, thus relieving their frightening chest pains and reducing their risk of having fatal coronaries.

Rather than relying on conventional drugs or surgery to un-

bad for it; nature has built the correct instincts into you from birth. Once you begin to notice and obey these innate tendencies, you will find that your physiology is capable of achieving balance on its own, with minimal effort on your part.

As we go on to explore, extremely small imbalances in your system sow the seeds of future illness, while preserving balance can ensure an ideal state of health. The strong and weak points of each body type are laid out, enabling you to choose your own specific approach to disease prevention. The sickness you should seek to avoid is the one that you are most prone to, and that is indicated by your prakriti.

### *Part II: The Quantum Mechanical Human Body*

In this section we delve deeper into the quantum level inside ourselves, exploring how the mind directs the body toward sickness and health. Thousands of years before modern medicine discovered the mind-body connection, the sages of Ayurveda had mastered it—they developed an “inner technology” that operates from the most profound levels of our awareness. The secret of perfect health lies with the practice of these techniques. We discuss the role of meditation in removing the obstacles to health; we explore how the quantum mechanical human body can be exploited to change the physical body far more powerfully than can any drug, diet, or exercise.

In this section we range widely through many subjects, from addictions to cancer to removal of physical and mental toxins—all the areas of medicine that are treated at a Maharishi Ayurveda clinic. By seeing yourself through the eyes of an Ayurvedic doctor and reading case studies of people who have gone through our programs, you will better understand why “quantum healing” represents a major advance in our approach to mind and body.

### *Part III: Living in Tune with Nature*

After presenting the grand design of Maharishi Ayurveda, I end with the practical advice I have gleaned over the past five years. The ideal of perfect health depends upon perfect balance. **Everything you eat, say, think, do, see, and feel affects your overall state of balance.** It would seem impossible to control all these different

multiple personalities includes patients who can instantly alter their pattern of brain waves on an EEG or transform the color of their eyes from blue to brown. One woman had three separate menstrual periods each month, corresponding to her three separate personalities.

Timmy is particularly amazing because one of his personalities, and only one, is allergic to orange juice and breaks out in hives if he drinks it. Health writer Daniel Goleman reports in the *New York Times*, "The hives will occur even if Timmy drinks orange juice and another personality appears while the juice is still being digested. What is more, if Timmy comes back while the allergic reaction is present, the itching of the hives will cease immediately, and the water-filled blisters will begin to subside."

This is a perfect example of how signals from the quantum mechanical body can cause instantaneous changes in the physical body. What is remarkable here is that allergies are not known to come and go at the whim of the mind. How could they? The white cells of the immune system, coated with antibodies that cause the allergic reaction, wait passively for the contact of an antigen. When contact occurs, a series of chemical reactions is triggered automatically.

Yet, in Timmy's case, it appears that as the molecules of orange juice approach his white cells, a *decision* is made whether to react or not. This implies that the cell itself is intelligent. Moreover, its intelligence is contained at a level deeper than its molecules, for the antibody and the orange juice meet end to end with very ordinary atoms of carbon, hydrogen, and oxygen.

To say that molecules can make decisions defies current physical science—it is as if sugar sometimes feels like being sweet and sometimes not. But it is not only the remarkable intensity of Timmy's case that stuns us. Once we absorb the fact that he is choosing to be allergic—for how else could he turn his hives off and on?—then we confront the possibility that we are choosing our own diseases, too. We are not aware of this choice, because it takes place at a level below our everyday thoughts. But if we have such an ability, we should be able to control it.

## THE BODY IS A RIVER

We all tend to see our bodies as "frozen sculptures"—solid, fixed, material objects—when in truth they are more like rivers,

A laboratory mouse will typically live fewer than two years raised in a cage on a normal diet. If you lower its body temperature and feed it a minimal amount of calories (while still preserving the vitamins, minerals, protein, and so on that it needs), the mouse's life span can be extended twice or even three times as long. On the other hand, if you expose the same mouse to abnormal stress, such as tossing it every day in front of a cat that is kept just out of reach, the mouse will very likely die in a matter of weeks. In every case, the mouse's internal organs will have aged to the same degree—the worn-out heart, liver, and kidneys will be uniformly "old," even though the oldest mouse lived perhaps fifty times longer than the youngest.

As the balance of forces change, life changes. In the case of human beings, environment can be chosen and controlled, which gives our own life spans enormous flexibility. When we speak of perfect health, we are proposing that the dynamic balance of life can be tipped to our advantage. No one has lived forever, but you can add 50 years to an average, modern life span of 70 years and reach the longest life span on record (121 years, credited to an offshore Japanese islander). In the Roman empire, adult life expectancy was 28 years; by the year 2000 it may rise to 90 years for a healthy American, male or female. That represents a great deal of flexibility.

If you look at the smallest unit of life—the cell—the discrepancy between a long and a short life is even more pronounced. Fetch a pail of water from the edge of a pond. When you put a drop under a microscope, it will be teeming with one-celled plants and animals—paramecia, amoebae, algae, and so on. Each amoeba may have a life span of only two or three weeks. But because amoebae multiply by division, the genetic material inside each amoeba is as old as the mother cell it came from, which makes it four weeks old instead of two. The mother cell descended from its own mother, so you would have to say that part of the amoeba you are looking at is three times as old as you thought, part of it four times as old, until you come to the conclusion that, in part, this single amoeba from your local pond is as old as all the amoebae that have ever lived, perhaps a billion years.

The actual atoms and molecules inside the amoeba have not inhabited it for that long. They come and go constantly, in a swirl of oxygen, hydrogen, carbon, and nitrogen. Nevertheless, the

amoeba retains its shape and identity generation after generation. Some living force holds it together, and as long as the amoeba's DNA is not destroyed, this cell will house its portion of life forever.

Your body, composed of between 50 and 100 trillion cells, is inconceivably more complex than an amoeba, but you are human life that is just as old and just as young at the same time. To talk accurately about the human life span, you must refer to the many life spans represented inside one body. A typical cell in the lining of your stomach lives only a few days and a typical skin cell lives only two weeks; a red blood cell lives longer—two or three months. Very long-lived cells can be found in the liver, where the cells take several years to replace themselves; heart and brain cells apparently last a lifetime without reproducing.

The amazing thing is that the exact same DNA controls all of these life spans, from the very shortest to the very longest. All skin cells and brain cells are genetically identical; they are descended from the moment of conception, when half of your father's DNA was fused with half of your mother's to form the unique strand of DNA that became you. Through a process we do not yet understand, your DNA was able to create all kinds of specialized cells—liver, skin, heart, liver, and so on—each with its own allotted life span. You cannot tell which life will be long or short just by looking at the cell: the neurons in your brain, which last a lifetime, are genetically identical to the olfactory cells in your nose, which give you your sense of smell, yet olfactory cells are replaced every four weeks.

Like the amoeba, each human cell is made of atoms that are constantly flying through it—it takes only a few thousandths of a second to exchange oxygen and carbon dioxide in your lungs; sodium and potassium ions are pumped in and out of brain cells three hundred times per second. Your heart muscle extracts oxygen out of the blood's hemoglobin so quickly that in a few seconds the blood feeding the heart via the coronary arteries, which is bright red in color, exits almost black.

But this endless swirl of activity doesn't dissolve your shape or identity, any more than it does the amoeba's. Your DNA has been distinctly human for at least 2 million years; the primitive DNA it is descended from is as old as life itself, dating back almost 2 billion years. You are exceedingly permanent at the genetic level, although the material of your body comes and goes.

influences at once. Yet, by following specific body-type diets, exercises, and daily and seasonal routines, you can correct the vast majority of imbalances now present in your physiology and prevent those that might lie in the future.

## THE REENCHANTMENT OF NATURE

It is fascinating to see how perfect health dovetails into a broader intellectual movement that is rocking the foundations of science. Ilya Prigogine, Nobel Prize winner in chemistry in 1977 and a pioneer in this movement, calls it "the reenchantment of nature"—the realization that nature is not a machine but a wondrous environment whose hidden possibilities are barely guessed at today. Nature is like a radio band with infinite stations; the reality you are now experiencing is only one station on the band, completely convincing as long as you stay tuned to it, but masking the other choices that lie on either side.

At the turn of the century, psychologist William James hinted at the mechanism that allows us to turn the dial: "One of the greatest discoveries of my generation," he wrote, "was that human beings can alter their lives by altering their attitudes of mind. This was a very farseeing remark, aimed more at the future than at James's time. In his day it was undisputed that nature unfolded mechanically, the result of inflexible laws operating without regard for human beings. Now it appears that human beings actually may count for a lot—perhaps nature is giving us only the reality we expect and believe in.

Certainly we have spent many centuries believing in disease and dying. This says much more about our relation to life than it does about life itself. Life is immensely flexible, and the forces that cause it to endure are at least as strong as those that cause it to decay. If you plant a bristlecone pine on a downtown lot in a polluted city, it may live for fifty years; planted in the country, its life span may increase to two or three hundred years; on the windswept ridges of the Rocky Mountains, it might survive more than two thousand years. Which life span is its natural one? It depends entirely on the situation. Some forces are always working to preserve the bristlecone's life, others to oppose it. In that dynamic balance lies the tree's destiny. Both a relatively short life and an immensely long one are natural, depending on the environment.

We can only speculate how far evolution will take us, but there are dramatic instances where the mind refused to believe in disease and the body suddenly followed. This past year I saw a Swiss patient named Andreas Schmitt who had been diagnosed with a fatal cancer. A year and a half ago he noticed a sore spot on his back that bothered him whenever he leaned back in his chair. Exploring with his fingers, he detected a swollen area about the size of a dime. His wife said it looked like an enlarged dark mole; angling with his wife's hand mirror, Andreas caught a glimpse of a purplish-brown growth located squarely between his shoulder blades.

Events moved quickly and grimly after that. An oncologist in Geneva took a biopsy, which revealed the presence of melanoma, the most virulent and fastest-spreading form of skin cancer. Within a day Andreas was operated on. The surgeons removed the growth and explored the lymph nodes under the right armpit. Fourteen suspected nodes were removed; four of them turned out to have melanoma cells inside. Now that the original melanoma was gone, the next step was to radiate the sites on his back and shoulder to catch any stray cancer cells that might remain. Andreas, a well-educated man in his early fifties, refused the radiation.

"My logic," he told me later, "was just to wait and see. The tumor was gone; I had suffered considerable trauma from the surgery, and inside I wasn't sure that I felt strong enough to submit to more treatments. If I had time to recover at home and build up my confidence, wouldn't I be better off?"

This decision disturbed his oncologist, who said that if Andreas discontinued treatment, his melanoma would almost surely be back in six months.

"And with radiation it won't?" Andreas asked.

"The chances will be smaller," his doctor said.

"And how much longer can I expect to live after that?" Andreas asked.

His doctor was forced into an uneasy guess. Untreated, metastatic melanoma patients may live only a few months; treated to the maximum, their life expectancy stretches out, sometimes by a few years, sometimes not. After five years, the number of long-term survivors is under 10 percent. Within ten years, virtually no one is left alive.

"So if I am not going to survive in the long run," Andreas said, "why go through the agony just to please some doctor?"

## LIFE FREE FROM IMPERFECTIONS

If life can be so flexible and dynamic, the wonder is that we do not last longer. And we would, if we knew how to handle the balance of forces that are at work in and around us. The ancient sages of Ayurveda were bold enough to ask the ultimate question: Must we become sick and grow old at all? Their answer was no. If the forces inside us are kept in harmony and in balance with the surrounding environment, we can be immune to illness. Perfect balance makes perfect health possible.

In Maharishi Ayurveda we rely on the basic principle that any disorder can be prevented as long as balance is maintained, not just in the body, but in the mind and spirit as well. The Ayurvedic sages teach that there is an impulse in all of us to grow and progress. This impulse governs our overall balance automatically; it can be seen at work in every cell, but particularly in the brain, which simultaneously balances body temperature, metabolic rate, growth, hunger and thirst, sleep, blood chemistry, respiration, and numerous other functions. Their coordination must be incredibly precise for health to be maintained (the hypothalamus, a tiny region of the forebrain no bigger than a fingertip, coordinates dozens of the body's automatic functions, earning it the nickname "the brain's brain").

But the real source of balance goes deeper still, to the quantum level. Here our basic impulse to grow and progress can be tapped through special techniques that we will explore. This is a vital and yet largely unknown area to most people, which is why they frequently find themselves helpless in the face of illness and aging. When the forces acting against life gain the upper hand, the body has no choice but to deteriorate over time.

On the other hand, if we learn to live in balance from the deepest level, our inner growth has no foreseeable limits. Dozens of books expound the value of inner growth, but they miss the key ingredient that Ayurveda emphasizes: Growth is automatic; it is in nature's plan, built into our very cells. It is only a question of following the silent river of intelligence to its source. That is the final secret of perfect health. If we could allow the mind to expand and to explore higher realities, the body would follow. Wouldn't that be enough to save it from disease and old age?

15 de abril del 2025

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**Estimados señores:**

Por este medio, yo Valeria Arias Gómez, estudiante de la Universidad Internacional de las Américas, comunico que los documentos facilitados por el Hospital México para la elaboración de las traducciones de mi tesis, titulada Translation and Analysis of the Document "Lípidos, Lipoproteínas y Aterogénesis" from Spanish into English and "Perfect Health" from English into Spanish for Hospital México, han sido debidamente entregados y recibidos, junto con sus respectivas traducciones, por la Biblioteca del Hospital México.

Firma y cédula del estudiante

*Valeria*  
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