Special Issue 5
2022

https://www.theghmethod.com

The GH-Method

Viscoelastic Medicine theory (VMT #409): Relationships between longevity via age difference and five mortality diseases, CVD, CKD, cancers, Alzheimer's and Parkinson's using viscoplastic energy model of GH-Method: math-physical medicine (No. 1011)

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Abstract

The author, a non-smoker who abstains from alcohol and illicit drugs and has minimal exposure to environmental hazards, acknowledges an inability to change his physical age, genetic conditions, or family history. Consequently, he has opted to focus on five selected metabolism and lifestyle inputs that are linked to some mortality diseases, specifically cardiovascular diseases and strokes (CVD), chronic kidney diseases (CKD), various cancers (Cancer), Alzheimer's disease (AD), and Parkinson's disease (PD). Since 2012, he has been gathering around 3 million personal health data and utilizing this information to evaluate his risks of developing the aforementioned five fatal conditions.

In a previous paper (number 1010), he analyzed his longevity perspective by examining five selected metabolic disorders and lifestyle factors. Similarly, in this particular study, he employed the same space-domain viscoplastic medicine energy method (SD-VMT) to explore his longevity outlook, focusing on the "age difference" between his biological age and health age, using the aforementioned five risk probabilities of fatal diseases as inputs for his longevity research covering a period from 2012 to 2023.

His estimated "health age" is calculated using the following formula: Health Age = Real Biological Age * (1 + ((MI - 0.735)/0.735)/2).

Here, "MI" refers to the daily "metabolism index" value, which combines four metabolic disorders and six lifestyle details, consisting of over 500 detailed elements.

In summary, the correlations between his age difference and the five inputs are extremely high, within the range of 95% and 100%.

His total SD-VMT energy is 279 with the following five energy contribution ratios: CVD= 23%; CKD = 27%; Cancer = 16%; AD = 19%; PD = 15%.

The time-zone energy distributions are: Y12-Y17 = 97%; Y18-Y23 = 3%.

Key message:

The author was diagnosed with severe Type 2 Diabetes in 1995 and encountered escalating health issues by 2010, characterized by a high HbA1C at 11%, five cardio episodes, and kidney problems. At that time, weighing 220 lbs (BMI 32), and grappling with hypertension and dyslipidemia for over ten years due to poor diet choices and physical inactivity. The life-threatening situation in 2010 prompted him to drastically overhaul his lifestyle to safeguard his health. From 2012 to 2017, 97% of his total energy of longevity versus risks of having five mortality diseases was unhealthy, but from 2018 to 2023, it was merely 2%, indicating a very healthy condition. Fortunately, he shows no signs of cancer or dementia.

The author's longevity perspective was primarily influenced by his CKD (27%) and CVD (23%), followed by AD, Cancers, and PD with notable impacts between 15% and 19%. The results from this specific analysis of longevity versus 5 mortality diseases (paper number 1012) are very similar to his previous analysis of longevity versus 5 metabolism and lifestyle inputs (paper number 1011).

Keywords: Viscoelastic; Viscoplastic; Diabetes; Glucose; Biomarkers; Insulin; Hyperglycemia; Hypertension

Available online: 4 April 2024

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Abbreviations: CGM: continuous glucose monitoring; T2D: type 2 diabetes; PPG: postprandial plasma glucose; FPG: fasting plasma glucose; SD: space-domain; VMT: viscoelastic medicine theory; FFT: Fast Fourier Transform; CKD: chronic kidney diseases; CVD: cardiovascular diseases

1. INTRODUCTION

The author, a non-smoker who abstains from alcohol and illicit drugs and has minimal exposure to environmental hazards, acknowledges an inability to change his physical age, genetic conditions, or family history. Consequently, he has opted to focus on five selected metabolism and lifestyle inputs that are linked to some mortality diseases, specifically cardiovascular diseases and strokes (CVD), chronic kidney diseases (CKD), various cancers (Cancer), Alzheimer's disease (AD), and Parkinson's disease (PD). Since 2012, he has been gathering around 3 million personal health data and utilizing this information to evaluate his risks of developing the aforementioned five fatal conditions.

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1.1 Biomedical information:

The following sections contain excerpts and concise information drawn from multiple medical articles, which have been meticulously reviewed by the author of this paper. The author has adopted this approach as an alternative to including a conventional reference list at the end of this document, with the intention of optimizing his valuable research time. It is essential to clarify that these sections do not constitute part of the author's original contribution but have been included to aid the author in his future reviews and offer valuable insights to other readers with an interest in these subjects.

Statistics data regarding longevity and CVD, CKD, cancers, Alzheimer's and Parkinson's diseases:

Statistics data regarding longevity and CVD, CKD, cancers, Alzheimer's and Parkinson's diseases:

Here is a comprehensive overview of life expectancy and related statistics for various diseases:

Cardiovascular Diseases (CVD) Reduced Risk Over Time:
The lifetime risk of CVD decreased significantly from 1960-1979 to 2000-2018, from 36.3% to 26.5% in women, and from 52.5% to 30.1% in men. Modern individuals are experiencing their first CVD events later in life.

Life Expectancy:
Life expectancy at age 50 is 27.3 years for those with low cardiovascular health (CVH), 32.9 years for moderate CVH, and 36.2 years for high CVH. Participants with high CVH lived about 8.9 years longer on average than those with low CVH, with 42.6% of this gain due to reduced CVD death.

Chronic Kidney Disease (CKD) Variable Life Expectancy:
For stage 5 CKD, life expectancy ranges from 4 to 14 years depending on age and sex, with men generally having a slightly longer expectancy than women. For stage 1 CKD, the life expectancy is about 15 years for a 60-year-old man, and slightly less for a woman. A successful transplant can improve life expectancy significantly

Cancer:

Survival Rates:
The 5-year survival rate is a common measure, varying significantly across different cancer types. For example, breast, prostate, testicular, and colon cancers have

high survival rates, while brain and pancreatic cancers have much lower rates.

Improvements Over Time:
There has been a notable increase in the 5-year survival rate from 48.9% (1975-1977) to 69.2% (2007-2013) in the U.S., coinciding with a 20% decrease in cancer mortality from 1950 to 2014.

Alzheimer's Disease

Average Life Expectancy:
The average life expectancy post-diagnosis is around 4 to 8 years, though it can be as long as 20 years in some cases. Age at diagnosis is a significant factor; younger patients tend to live longer.

Parkinson's Disease

Near-Normal Life Expectancy:
People with Parkinson's often live almost as long as those without the disorder. On average, individuals with Parkinson's die at the age of 81, comparable to national life expectancy rates. Life expectancy has increased significantly since 1967, by about 55%, now exceeding 14.5 years post-diagnosis.

These statistics reflect advancements in medical science and the varying impact of these diseases on life expectancy.

1.2 MPM Background:

To learn more about his developed GH-Method: math-physical medicine (MPM) methodology, readers can read the following three papers selected from his published 760+ papers.

The first paper, No. 386 (Reference 1) describes his MPM methodology in a general conceptual format. The second paper, No. 387 (Reference 2) outlines the history of his personalized diabetes research, various application tools, and the differences between the biochemical medicine (BCM) approach versus the MPM approach. The third paper, No. 397 (Reference 3) depicts a general flow diagram containing ~10 key MPM research methods and different tools.

The author's diabetes history:

The author has been a severe T2D patient since 1995. He weighed 220 lb. (100 kg) at that time. By 2010, he still weighed 198 lb. with an average daily glucose of 250 mg/dL (HbA1C at 10%). During that year, his triglycerides reached 1161 (high risk for CVD and stroke) and his albumin-creatinine ratio (ACR) at 116 (high risk for chronic kidney disease). He also suffered from five cardiac episodes within a decade. In 2010, three independent physicians warned him regarding the need for kidney dialysis treatment and the future high risk of dying from his severe diabetic complications.

In 2010, he decided to self-study endocrinology with an emphasis on diabetes and food nutrition. He spent the entire year of 2014 developing a metabolism index (MI) mathematical model. During 2015 and 2016, he developed four mathematical prediction models related to diabetes conditions: weight, PPG, fasting plasma glucose (FPG), and HbA1C (A1C). Through using his developed mathematical metabolism index (MI) model and the other four glucose prediction tools, by the end of 2016, his weight was reduced from 220 lbs. (100 kg) to 176 lbs. (89 kg), waistline from 44 inches (112 cm) to 33 inches (84 cm), average finger-piercing glucose from 250 mg/dL to 120 mg/dL, and A1C from 10% to ~6.5%. One of his major accomplishments is that he no longer taken any diabetes-related medications since 12/8/2015.

In 2017, he achieved excellent results on all fronts, especially his glucose control. However, during the pre-COVID period, including both 2018 and 2019, he traveled to ~50 international cities to attend 65+ medical conferences and made ~120 oral presentations. This hectic schedule inflicted damage to his diabetes control caused by stress, dining out frequently, post-meal exercise disruption, and jet lag, along with the overall negative metabolic impact from the irregular life patterns; therefore, his glucose control was somewhat affected during the two-year traveling period of 2018-2019.

He started his COVID-19 self-quarantined life on 1/19/2020. By 10/16/2022, his weight was further reduced to ~164 lbs. (BMI 24.22) and his A1C was at 6.0% without any medication intervention or insulin injection. In fact, with the special COVID-19 quarantine lifestyle since early 2020, not only has he written and published ~500 new research articles in various medical and engineering journals, but he has also achieved his best health conditions for the past 27 years. These achievements have resulted from his non-traveling, low-stress, and regular daily life routines. Of course, his in-depth knowledge of chronic diseases, sufficient practical lifestyle management experiences, and his developed high-tech tools have also contributed to his excellent health improvements.

On 5/5/2018, he applied a continuous glucose monitoring (CGM) sensor device on his upper arm and checked his glucose measurements every 5 minutes for a total of 288 times each day. Furthermore, he extracted the 5-minute intervals from every 15-minute interval for a total of 96 glucose data each day stored in his computer software.

Through the author's medical research work of over 40,000 hours and reading over 4,000 published medical papers online in the past 13 years, he discovered and became convinced that good life habits of not smoking, moderate or no alcohol intake, avoiding illicit drugs; along with eating the right food with well-balanced nutrition, persistent exercise, having a sufficient and good quality of sleep, reducing all kinds of unnecessary stress, maintaining a regular daily life routine contribute to the risk reduction of having many diseases, including CVD, stroke, kidney problems, micro blood vessels issues, peripheral nervous system problems, and even cancers and dementia. In addition, a long-term healthy lifestyle can even "repair" some damaged internal organs, with different required time lengths depending on the particular organ's cell lifespan. For example, he has "self-repaired" about 35% of his damaged pancreatic beta cells during the past 10 years.

Energy theory:

The human body and organs have around 37 trillion live cells which are composed of different organic cells that require energy infusion from glucose carried by red blood cells; and energy consumption from labor-work or exercise. When the residual energy (resulting from the plastic glucose scenario) is stored inside our bodies, it will cause different degrees of damage or influence to many of our internal organs.

According to physics, energies associated with the glucose waves are proportional to the square of the glucose amplitude. The residual energies from elevated glucose are circulating inside the body via blood vessels which then impact all of the internal organs to cause different degrees of damage or influence, e.g. diabetic complications. Elevated glucose (hyperglycemia) causes damage to the structural integrity of blood vessels. When it combines with both hypertension (rupture of arteries) and hyperlipidemia (blockage of arteries), CVD or Stroke happens. Similarly, many other deadly diseases could result from these excessive energies which would finally shorten our lifespan. For example, the combination of hyperglycemia and hypertension would cause micro-blood vessel leakage in kidney systems which is one of the major causes of CKD.

The author then applied Fast Fourier Transform (FFT) operations to convert the input wave from a time domain into a frequency domain. The y-axis amplitude values in the frequency domain indicate the proportional energy levels associated with each different frequency component of input occurrence. Both output symptom value (i.e. strain amplitude in the time domain) and output symptom fluctuation rate (i.e. the strain rate and strain frequency) influence the energy level (i.e. the Y-amplitude in the frequency domain).

Currently, many people live a sedentary lifestyle and lack sufficient exercise to burn off the energy influx which causes them to become overweight or obese. Being overweight and having obesity leads to a variety of chronic diseases, particularly diabetes. In addition, many types of processed food add unnecessary ingredients and harmful chemicals that are toxic to the bodies, which lead to the development of many other deadly diseases, such as cancers. For example, ~85% of worldwide diabetes patients are overweight, and ~75% of patients with cardiac illnesses or surgeries have diabetes conditions.

In engineering analysis, when the load is applied to the structure, it bends or twists, i.e. deforms; however, when the load is removed, it will either be restored to its original shape (i.e, elastic case) or remain in a deformed shape (i.e. plastic case). In a biomedical system, the glucose level will increase after eating carbohydrates or sugar from food; therefore, carbohydrates and sugar function as the energy supply. After having labor work or exercise, the glucose level will decrease. As a result, the exercise burns off the energy, which is similar to load removal in the engineering case. In the biomedical case, both processes of energy influx and energy dissipation take some time which is not as simple and quick as the structural load removal in the engineering case. Therefore, the age difference and 3 input behaviors are "dynamic" in nature, i.e. time-dependent. This time-dependent nature leads to a "viscoelastic or viscoplastic" situation. For the author's case, it is "viscoplastic" since most of his biomarkers have continuously improved during the past 13-year time window.

Time-dependent output strain and stress of (viscous input*output rate):

Hooke's law of linear elasticity is expressed as:

Strain (ε: epsilon) = Stress (σ: sigma) / Young's modulus (E)

For biomedical glucose application, his developed linear elastic glucose theory (LEGT) is expressed as:

PPG (strain) = carbs/sugar (stress) * GH.p-Modulus (a positive number) + post-meal walking k-steps * GH.w-Modulus (a negative number)

where GH.p-Modulus is the reciprocal of Young's modulus E.

However, in viscoelasticity or viscoplasticity theory, the stress is expressed as:

Stress = viscosity factor (η: eta) * strain rate (dε/dt)

where strain is expressed as Greek epsilon or ε.

In this article, in order to construct an "ellipse-like" diagram in a stress-strain space domain (e.g., "hysteresis loop") covering both the positive side and negative side of space, he has modified the definition of strain as follows:

Strain = (body weight at a certain specific time instant)

He also calculates his strain rate using the following formula:

Strain rate = (body weight at next time instant) - (body weight at present time instant)

The risk probability % of developing into CVD, CKD, and Cancer is calculated based on his developed metabolism index model (MI) in 2014. His MI value is calculated using inputs of 4 chronic conditions, i.e. weight, glucose, blood pressure, and lipids; and 6 lifestyle details, i.e. diet, drinking water, exercise, sleep, stress, and daily routines. These 10 metabolism categories further contain ~500 elements with millions of input data collected and processed since 2010. For individual deadly disease risk probability %, his mathematical model contains certain specific weighting factors for simulating certain risk percentages associated with different deadly diseases, such as metabolic disorder-induced CVD, stroke, kidney failure, cancers, dementia; artery damage in heart and brain, micro-vessel damage in kidney, and immunity-related infectious diseases, such as COVID death.

Some of the explored deadly diseases and longevity characteristics using the viscoplastic medicine theory (VMT) include stress relaxation, creep, hysteresis loop, and material stiffness, damping effect based on time-dependent stress and strain which are different from his previous research findings using linear elastic glucose theory (LEGT) and nonlinear plastic glucose theory (NPGT).

2. RESULTS

Figure 1 shows data table, inputs and SD-VMT energy output diagram.

3. CONCLUSION

In summary, the correlations between his age difference and the five inputs are extremely high, within the range of 95% and 100%.

His total SD-VMT energy is 279 with the following five energy contribution ratios:

CVD= 23%;
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Cancer = 16%
AD = 19%
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The time-zone energy distributions are:

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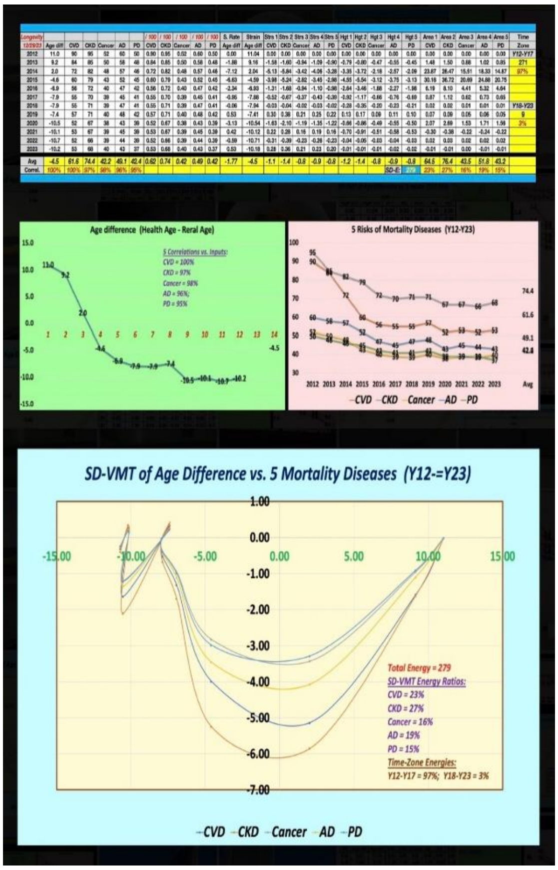

Figure 1: Data table, inputs and SD-VMT energy output diagram

Key message:

The author was diagnosed with severe Type 2 Diabetes in 1995 and encountered escalating health issues by 2010, characterized by a high HbA1C at 11%, five cardio episodes, and kidney problems. At that time, weighing 220 lbs (BMI 32), and grappling with hypertension and dyslipidemia for over ten years due to poor diet choices and physical inactivity. The life-threatening situation in 2010 prompted him to drastically overhaul his lifestyle to safeguard his health. From 2012 to 2017, 97% of his total energy of longevity versus risks of having five mortality diseases was unhealthy, but from 2018 to 2023, it was merely 2%, indicating a very healthy condition. Fortunately, he shows no signs of cancer or dementia.

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4. REFERENCES

For editing purposes, the majority of the references in this paper, which are self-references, have been removed from this article. Only references from other authors' published sources remain. The bibliography of the author's original self-references can be viewed at www.eclairemd.com.

Readers may use this article as long as the work is properly cited, their use is educational and not for profit, and the author's original work is not altered.

For reading more of the author's published VGT or FD analysis results on medical applications, please locate them through platforms for scientific research publications, such as ResearchGate, Google Scholar, etc.

Special Issue | Issue No. 5

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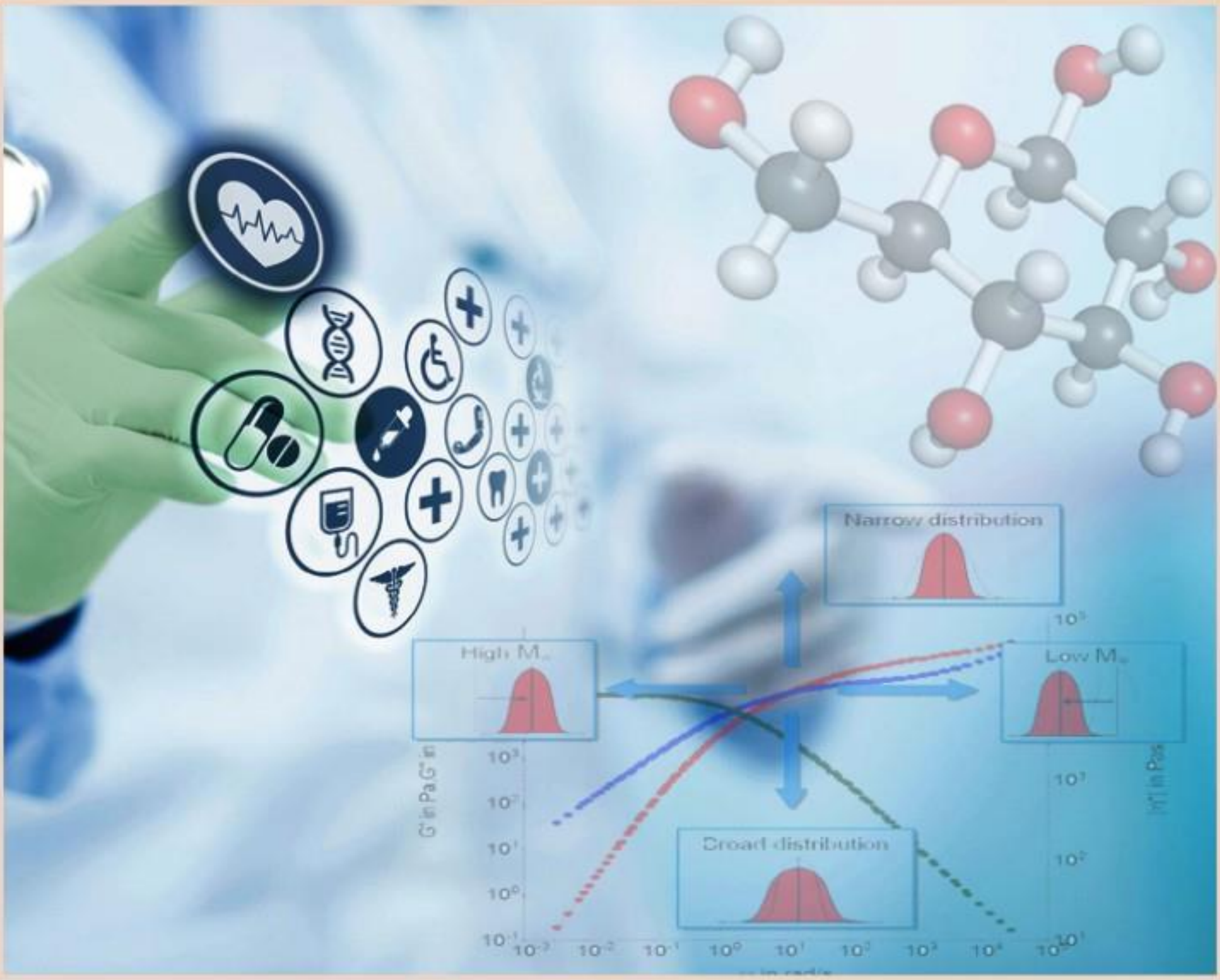

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