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The GH-Method

Assessment of six diseases resulted from four lifestyle details using both statistical correlation and viscoplastic energy model of GH-Method: math-physical medicine (No. 956)

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Abstract

After conducting three studies on metabolic disorders, focusing on the author's body weight (BW), fasting morning glucose (FPG), and post-meal glucose (PPG), the author scientifically established that food portion is the primary factor influencing his BW. His body weight is intricately linked to his FPG level, reflecting his pancreatic beta cells' insulin quality and emission. The FPG value further serves as the baseline for PPG formation, contributing over 50%, while diet and exercise are two significant secondary factors. He has proven that the ratio between his carb/sugar intake and his post-meal walking steps is 1.6 (31% divided by 19%), mirroring the explanation of pathophysiological pathways of 8 with diet versus 5 with exercise. Building on these findings, the author extended his research to examine six deadly diseases against four basic biomarkers: body weight (m1), glucose levels (m2), blood pressures (m3), and blood lipids/cholesterols (m4). And then, this particular article delves into hidden relationships and dynamics (i.e. energies) between these six diseases and four lifestyle details. Data collection spanned from 2012 (incomplete data) to an 11-year period from 1/1/2013 to 11/14/2023 for this study. Highest correlations (95-96%) exist between the 6 diseases and food plus drinking water (food/H2O) and stress plus daily routines (stress/routines), followed by sleep conditions (85%). The lowest correlation (70%) is observed with his walking exercise (steps), attributed to the author's aging and reduced exercise level after 2018, forming a "bowel" curve shape. In summary, the annual averaged risks of six deadly diseases display a descending trend akin to various skiing slopes from 2013 to 2023. Similarly, annual averaged lifestyle values, encompassing food/water, stress/daily routine, and sleep, are decreasing. However, daily walking steps exhibit a "bowel" curve, with the nadir (best exercise score or highest number of walking steps) around 2015-2018. Traditional statistical calculations yield "averaged" correlations between these six deadly diseases and four distinct lifestyle details: - 6 diseases vs. food/H2O: 96%; - 6 diseases vs. stress/routines: 95%; - 6 diseases vs. sleep: 85%; - 6 diseases vs. walking steps: 70%. Utilizing space-domain viscoplastic energy analysis, the study identifies four energy contribution margins for these diseases: - Energy from food/H2O: 28%; - Energy from sleep: 26%; - Energy from stress/routines: 24%; - Energy from walking steps: 23%.

Key Message: The energy contributions from four lifestyles to the risk of six diseases (heart attacks & strokes, kidney problems, cancers, Alzheimer's disease, Parkinson's disease, and diabetic neuropathy) are nearly equal, around 25% each. Therefore, for effective lifestyle management, attention must be given to all key aspects to reduce the risks of these six mortality diseases

Keywords: Viscoelastic; Viscoplastic; Diabetes; Glucose; Cardiovascular Disease; Chronic Kidney Disease; Cancer

Abbreviations: CGM: continuous glucose monitoring; T2D: type 2 diabetes; PPG: postprandial plasma glucose; FPG: fasting plasma glucose; CVD: Cardiovascular Disease; CKD: Chronic Kidney Disease

1. INTRODUCTION

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Building on these findings, the author extended his research to examine six deadly diseases against four basic biomarkers: body weight (m1), glucose levels (m2), blood pressures (m3), and blood lipids/cholesterols (m4). And then, this particular article delves into hidden relationships and dynamics (i.e. energies) between these six diseases and four lifestyle details. Data collection spanned from 2012 (incomplete data) to an 11-year period from 1/1/2013 to 11/14/2023 for this study. Highest correlations (95-96%) exist between the 6 diseases and food plus drinking water (food/H2O) and stress plus daily routines (stress/routines), followed by sleep conditions (85%). The lowest correlation (70%) is observed with his walking exercise (steps), attributed to the author's aging and reduced exercise level after 2018, forming a "bowel" curve shape.

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.

Pathophysiological explanations and statistics data regarding 6 diseases, specifically CVD, CKD, cancers, Alzheimer's diseases, Parkinson's disease, and diabetic neuropathy:

There is extensive scientific research and literature on the pathophysiological explanations and statistics concerning various diseases. Here's a brief overview:

Cardiovascular Disease (CVD):

CVD encompasses a range of conditions affecting the heart and blood vessels, including coronary artery disease, heart failure, and stroke. Common pathophysiological causes include atherosclerosis, hypertension, and chronic inflammation.

Statistics: According to the World Health Organization (WHO), CVD is the leading cause of death globally, accounting for approximately 32% of all deaths. Around 17.9 million people die from CVDs each year, and this number is expected to rise.

Chronic Kidney Disease (CKD):

CKD involves the gradual loss of kidney function over time and is often associated with conditions like diabetes and hypertension. Pathophysiological mechanisms include glomerular damage, tubulointerstitial fibrosis, and impaired renal function.

Statistics: The National Kidney Foundation reports that over 37 million American adults have CKD, and millions more are at increased risk. CKD is a major risk factor for cardiovascular events and is associated with a higher risk of mortality.

Cancer:

Cancer is a complex group of diseases characterized by the uncontrolled division and spread of abnormal cells. Pathophysiological mechanisms vary depending on the type of cancer and can include genetic mutations, environmental factors, and immune system dysfunction.

Statistics: According to WHO, cancer is the second leading cause of death globally, responsible for an estimated 9.6 million deaths in 2018. The number of new cancer cases is expected to rise to 29.5 million by 2040.

Alzheimer's Disease:

Alzheimer's is a progressive neurodegenerative disorder characterized by cognitive decline and memory loss. Pathophysiologically, it involves the accumulation of beta-amyloid plaques and tau protein tangles in the brain and neuronal degeneration.

Statistics: Alzheimer's is the most common cause of dementia, and an estimated 50 million people worldwide are living with dementia. This number is projected to triple by 2050.

Parkinson's Disease:

Parkinson's is a neurodegenerative disorder characterized by motor symptoms, such as tremors and bradykinesia. Pathophysiologically, it involves the loss of dopamine-producing neurons in the brain's substantia nigra.

Statistics: According to the Parkinson's Foundation, about 60,000 Americans are diagnosed with Parkinson's disease each year, and an estimated 1 million people in the United States are living with the disease.

Diabetic Neuropathy:

Diabetic neuropathy is a type of nerve damage that can occur in people with diabetes. It is caused by chronically high blood sugar levels and can affect nerves throughout the body.

Statistics: Diabetic neuropathy is a common complication of diabetes, occurring in up to 50% of people with diabetes. It can lead to significant morbidity, including foot ulcers, infections, and lower limb amputations.

These statistics and pathophysiological explanations underscore the significant public health impact of these diseases and the need for ongoing research, preventive strategies, and effective treatments to address them.

Pathophysiological explanations of aforementioned 6 deadly diseases with inputs of diet (food and drinking water), exercise, sleep, stress and daily routines or habits:

Here is a concise overview of the pathophysiological explanations for the six deadly diseases (heart attacks & strokes, kidney problems, cancers, Alzheimer's disease, Parkinson's disease, and diabetic neuropathy) with lifestyle inputs from diet (food and drinking water), exercise, sleep, stress, daily routines or good habits:

1. Heart Attacks & Strokes:

Diet:
High intake of saturated fats and cholesterol can lead to atherosclerosis, narrowing arteries and increasing the risk of blood clots.

Exercise:
Regular physical activity helps maintain healthy blood pressure, cholesterol levels, and overall cardiovascular function.

Sleep:
Poor sleep is associated with hypertension and inflammation, contributing to cardiovascular risks.

Stress:
Chronic stress may elevate blood pressure and impact heart health.

Daily Routines:
Healthy habits like not smoking and moderation in alcohol intake play a protective role.

2. Kidney Problems:

Diet:
High sodium and protein intake can strain the kidneys, contributing to kidney disease.

Exercise:
Regular physical activity supports overall health, reducing the risk of kidney problems.

Sleep:
Disrupted sleep patterns may affect kidney function and exacerbate existing conditions.

Stress:
Chronic stress can contribute to hypertension, a risk factor for kidney disease.

Daily Routines:
Staying hydrated and avoiding excessive use of certain medications are crucial for kidney health.

3. Cancers:

Diet:
Certain dietary factors, like processed meats and low-fiber diets, are linked to various cancers.

Exercise:
Regular physical activity is associated with a lower risk of several types of cancers. Sleep:

Disrupted sleep patterns may influence hormone regulation, impacting cancer risk.

Stress:
Chronic stress and inflammation may contribute to cancer development.

Daily Routines:
Avoiding tobacco, limiting alcohol, and practicing sun safety are vital preventive measures.

4. Alzheimer's Disease:

Diet:
Diets high in saturated fats and low in antioxidants may contribute to neurodegenerative processes.

Exercise:
Physical activity supports brain health and may reduce the risk of Alzheimer's.

Sleep:
Disrupted sleep patterns are associated with an increased risk of cognitive decline.

Stress:
Chronic stress may affect cognitive function and contribute to Alzheimer's progression.

Daily Routines:
Mental stimulation, social engagement, and lifelong learning are protective factors.

5. Parkinson's Disease:

Diet:
Certain pesticides and environmental toxins may contribute to Parkinson's; antioxidants in some foods may have protective effects.

Exercise:
Regular physical activity is associated with a lower risk of Parkinson's disease.

Sleep:
Sleep disturbances may precede the onset of Parkinson's symptoms.

Stress:
Chronic stress may exacerbate symptoms in individuals predisposed to Parkinson's.

Daily Routines:
Adequate rest, a balanced diet, and minimizing exposure to toxins are preventive measures.

6. Diabetic Neuropathy:

Diet:
Poorly managed blood sugar levels contribute to nerve damage in diabetes.

Exercise:
Regular physical activity helps control blood sugar levels and prevents complications.

Sleep:
Sleep disturbances can exacerbate diabetes-related neuropathic symptoms.

Stress:
Chronic stress can impact blood sugar control and worsen neuropathic symptoms.

Daily Routines:
Consistent blood sugar monitoring, medication adherence, and foot care are essential for preventing diabetic neuropathy.

2. METHODS

2.1 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 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.

2.2 The author's diabetes history

The author was 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 to develop 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 takes 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 own 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 checks 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 over 40,000 hours and read 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-length 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.

2.3 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 glucoses 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 an example, the combination of hyperglycemia and hypertension would cause micro-blood vessel's leakage in kidney systems which is one of the major cause 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) are influencing 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. deform; 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, the 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 are continuously improved during the past 13-year time window.

2.4 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 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 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, 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 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).

3. RESULTS

Figure 1 shows time-domain curves of 6 diseases and 4 biomarkers.

Figure 2 shows 6 data tables of deadly diseases.

Figure 3 shows the summarized conclusions.

4. CONCLUSION

In summary, the annual averaged risks of six deadly diseases display a descending trend akin to various skiing slopes from 2013 to 2023. Similarly, annual averaged lifestyle values, encompassing food/water, stress/daily routine, and sleep, are decreasing. However, daily walking steps exhibit a "bowel" curve, with the nadir (best exercise score or highest number of walking steps) around 2015-2018.

Traditional statistical calculations yield "averaged" correlations between these six deadly diseases and four distinct lifestyle details:
- 6 diseases vs. food/H2O: 96%
- 6 diseases vs. stress/routines: 95%
- 6 diseases vs. sleep: 85%
- 6 diseases vs. walking steps: 70%

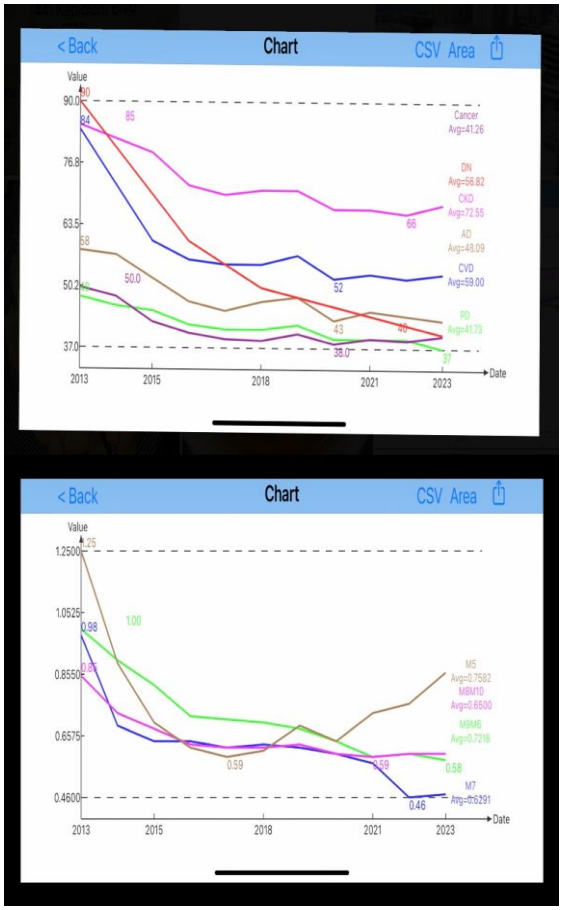

Figure 1: Time-domain curves of 6 diseases and 4 biomarkers.

Utilizing space-domain viscoplastic energy analysis, the study identifies four energy contribution margins for these diseases:
- Energy from food/H2O: 28%
- Energy from sleep: 26%
- Energy from stress/routines: 24%
- Energy from walking steps: 23%

5. KEY MESSAGE

The energy contributions from four lifestyles to the risk of six diseases (heart attacks & strokes, kidney problems, cancers, Alzheimer's disease, Parkinson's disease, and diabetic neuropathy) are nearly equal, around 25% each. Therefore, for effective lifestyle management, attention must be given to all key aspects to reduce the risks of these six mortality diseases

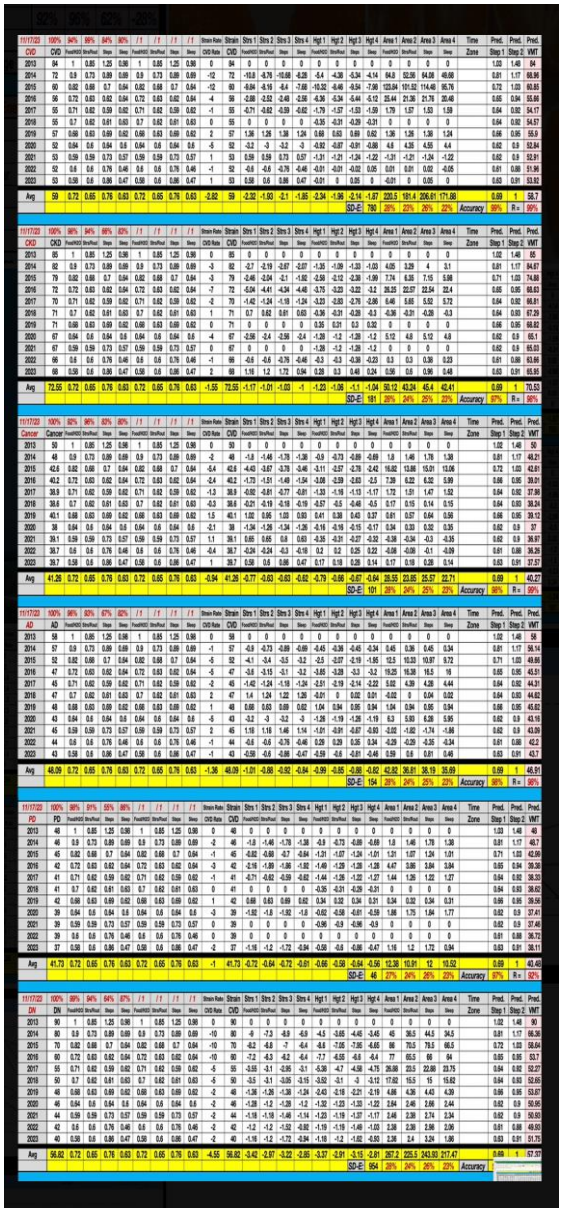

Figure 2: 6 data tables of diseases

Correlation	Food/H2O	Strs/Rout	Steps	Sleep
CVD	94%	99%	84%	90%
CKD	98%	94%	66%	83%
Cancer	92%	96%	83%	80%
AD	96%	93%	67%	82%
PD	98%	91%	55%	86%
DN	99%	94%	64%	87%
Average	96%	95%	70%	85%

VMT Energy	Food/H2O	Strs/Rout	Steps	Sleep
CVD	28%	23%	26%	22%
CKD	28%	24%	25%	23%
Cancer	28%	24%	25%	23%
AD	28%	24%	25%	23%
PD	27%	24%	26%	23%
DN	28%	24%	26%	23%
Average	28%	24%	26%	23%

Figure 3: Summarized conclusions

6. REFERENCES

For editing purposes, majority of the references in this paper, which are self-references, have been removed for 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.

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.

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Viscoelastic and Viscoplastic Glucose Theory Application in Medicine

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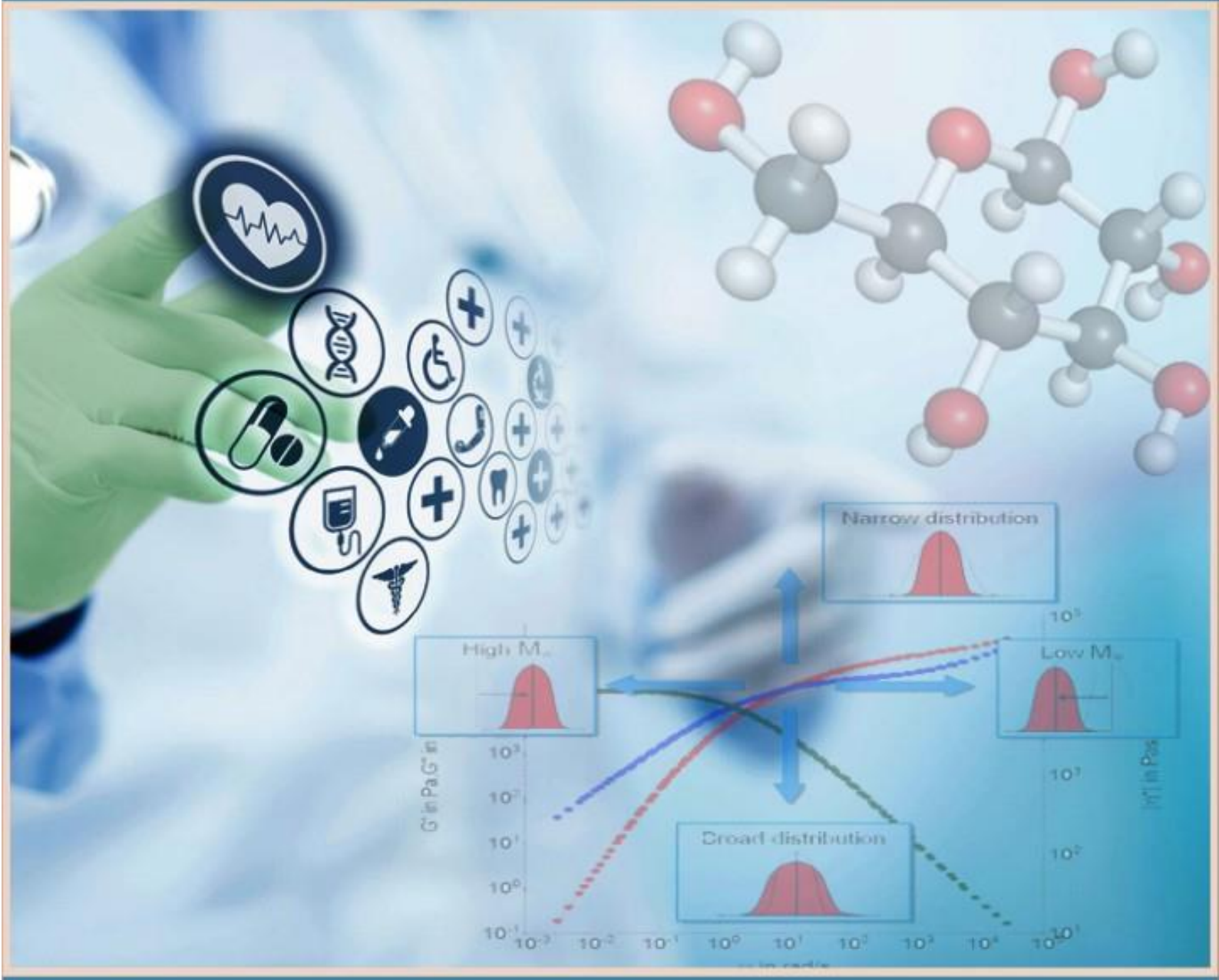

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