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The GH-Method

Viscoelastic and Viscoplastic Glucose Theory (VGT #135): Using Space-Domain VGT Energy Method to Investigate the Pathway and Inter-Relationship Between Causes and Symptoms Among 4 Lifestyle Details (Diet, Exercise, Sleep, and Stress), 4 Chronic Conditions (Body Weight, Glucose, Blood Pressure, and Blood Lipids), 3 Deadly Diseases (CVD, CKD, and Cancers) and the Ultimate Goal of Longevity (Health Age or Epigenetic Age, Not Chronological Real Age) Over a Long Period of 8 to 10+ Years Based on Math-Physical Medicine Method (No. 726)

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Abstract

This study applies space-domain viscoelastic and viscoplastic energy methods to investigate the pathway and inter-relationships of longevity versus 4 lifestyle details (exercise, diet, sleep, and stress), 4 chronic conditions (obesity, diabetes, hypertension, and hyperlipidemia), and 3 deadly diseases (CVD, CKD, and cancer). It uses the author's own health data for ~10 years from 2012 to 2022. His health age was 76 while his real age was 66 in Y2013. A turning point occurred when his health age was 64 while his real age was 68 in Y2015. Currently, his health age is 64 while his real age is 75. This achievement is accomplished through a clear pathway from improving 4 lifestyle details, therefore controlling his 4 chronic conditions, and finally greatly reducing the risks of having 3 deadly diseases. (In 2019, the combination of CVD, CKD, cancers, and diabetes contributed ~50% of US annual death cases). Among the causes in the longevity pathway, his diet and exercise are more important than his sleep and stress; his body weight and glucose are more serious than his blood pressure and blood lipids. In terms of deadly diseases, his CKD risk is higher than the CVD risk which is further higher than his cancer risk. The earlier years cause contributed ~90% of the total energy of symptom. This article has provided quantitative data to verify above findings which also match with his past medical records and health history over the past decade.

Keywords: Viscoelastic; Viscoplastic; Lifestyle; Chronic conditions; Diseases; Longevity; Fasting plasma glucose; Postprandial plasma glucose

Abbreviations: FFT: fast Fourier transform; PPG: postprandial plasma glucose; FPG: fasting plasma glucose; TD: time domain; FD: frequency domain; SD: space domain; MPM: math-physical medicine

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1. INTRODUCTION

The author recently read two reports regarding gerontology and geriatrics. The first one is "Biological age, not birthdate may reveal healthy longevity" written by the University of California - San Diego, and the second one is "Reversing Your Epigenetic Age, Is That Possible?" written by Lewis Chang, Ph.D., a Scientific Editorial Manager of R&D at Metagenics. The findings from these two reports have matched quite well with many of his published research works on longevity. As a future reference, he has kept these two short excerpts in his Papers No. 723 and No. 724, respectively.

This particular article is a summary of the following papers: No. 724 covering health age versus food, exercise, sleep, and stress; No. 723 regarding health age versus body weight, glucose, blood pressure, and blood lipids; and No. 725 concerning health age versus cardiovascular diseases (CVDs), chronic kidney disease (CKD), and cancers. He attempts to provide a roadmap or pathway for his longevity concerns and their connectivity with the 4 lifestyle details, 4 chronic conditions, and 3 deadly disease complications.

The author's medical research work is heavily dependent on his developed math-physical medicine (MPM) research methodology and related tools which include mathematical theorems, the laws of physics, and engineering techniques. His research does not utilize publicly available data, any institutions, or other patients' collected data. Instead, he uses a big database (3+ million collected and processed data) based on his own health conditions and lifestyle details over the past 12 years from 1/1/2012 through 8/20/2022.

In 2014, he applied the mathematical topology concept, nonlinear algebra, and geometric algebra along with the engineering finite-element technique, to develop a rather comprehensive mathematical algorithm for measuring human metabolism status, the metabolism index (MI) model.

This MI model contains ten specific categories, including four output categories of medical conditions (m1=body weight, m2=glucose, m3=blood pressure, and m4=lipids), and six input categories of lifestyle details (physical exercise=m5, drinking water=m6, sleep=m7, stress=m8, food quantity and quality=m9, and daily life routines=m10). These 10 categories are comprised of approximately 500 detailed elements which include 4 basic chronic disease categories and 6 basic lifestyle categories. He also defined two new resulting parameters: the metabolism index or MI, as the combined and normalized score of the above 10 metabolism categories and 500 elements using his developed algorithm, along with the general health status unit (GHSU), as the 90-day moving average value of MI.

A physical analogy of this mathematical metabolism model is similar to a model of "using multiple nails that are encircled by many rubber bands". For example, first, we hammer 10 nails into a piece of flat wood with an initial shape of a circle, then take 3,628,800 (=10!) rubber bands to encircle these 10 nails. The ~3.6 million rubber bands, indicating the big number of nails' inter-relationships, show the possible relationships existing among the 10 nails (10 original metabolism data). Some rubber bands encircle 2 or 3 nails and so on until the last rubber band encircles all of the 10 nails together (no rubber band to encircle a single nail is allowed since it does not create tension). Now, if we move any one of the nails outward (i.e., moving away from the center of the nail circle), then this moving action would create some internal tension inside the encircled rubber band. Moving one nail "outward" means one of the ten metabolism categories is becoming "unhealthy" which would cause some stress to our body. Of course, we can also move some or all of the 10 nails outward at the same time, but with different moving distances. If we can measure the summation of the internal tension created in the affected rubber bands, then this summarized tension force is equivalent to the total metabolism value or the overall health conditions. The higher tension means a higher metabolism value which develops into an unhealthy situation. The author uses the above-described scenario of moving nails and their encircled rubber bands to explain his developed mathematical metabolism index model of human health.

Based on this MI model, he has further developed a few risk probability assessment models for CVD, CKD, cancers, and longevity.

For the longevity case, he created two following mathematical equations for both health age and age differences:

Mathematical Health Age
= Real Biological Age * (1+((MI-0.735)/0.735)/2)

Age difference
= mathematical health age - biological real age

Where MI is a daily "metabolism index" value which is a combined score of 4 biomarkers of weight, glucose, blood pressure, and blood lipids along with 6 lifestyle details of food, water intake, exercise, sleep, stress, and daily life routines. Furthermore, a positive number of age difference means a shorter expected lifespan and a negative number of age differences indicates a longer expected lifespan.

Based on the above descriptions, his combined MI model and related mathematical health age equation are quite close to the concept of epigenetic age (which may be in a reversed order) as described in other medical papers.

Regarding his medical research tools, upon the advice from his professor at MIT, Dr. Norman Jones, the author initiated his medical research work using the viscoelastic or viscoplastic engineering theory on 1/8/2022 beginning with his Paper No. 578. During this past 8-month research period, he has produced 133 papers (similar to doing 133 homework assignments with different subjects) where he has learned in depth the subtlety and things to watch out for by applying this specific VGT research tool in the ongoing biomedical research work.

In the following methods section, for the benefit of easier comprehension for medicine personnel and regular patients, he provides a brief description of the SD-VGT tool using English words instead of using physics theories or engineering techniques with complex mathematical equations. The data processing work in his papers No. 723, 724, 725, and 726 is conducted using both his developed VGT software module on the iPhone device and Excel calculation on his PC with inserted formula or equation at each calculation step (for debugging purposes).

Concerning these 3 research results using MPM methods of time-domain (TD), space-domain (SD), and frequency-domain (FD), most of these 3 sets of analysis results have some small deviations from each other, but they do possess a consistent and highly similar data pattern. In general, the TD energy ratios are less accurate due to their energy definition coming from rudimentary physics, while FD wave theory energy results are somewhat amplified due to the author's chosen definition of the new FD variable as the strain (symptom) multiplied with the stress (cause). Therefore, in this summarized paper, No. 726, he decided to use SD-VGT energy ratios only for illustration of his model and interpretation of his results. In addition, the term "longevity" used in this article means "health age", even though the "age difference" results are very similar to the "health age" results.

2. METHODS

2.1 The author's case of diabetes and complications

The author has been a severe T2D patient since 1996. He weighed 220 lb. (100 kg, BMI 32.5) at that time with a one-time glucose reading of 380 mg/dL. By 2010, he still weighed 198 lb. (BMI 29.2) with average daily glucose of 250 mg/dL (HbA1C of 10%). During that year, his triglycerides reached 1161b (hyperlipidemia) and albumin-creatinine ratio (ACR) at 116 (kidney issues). He also suffered from five cardiac episodes within a decade from 1993 through 2003 due to both work stress and diabetes. In 2010, three independent physicians warned him about his urgent need for kidney dialysis treatment and the risk of his life-threatening health situation (i.e. dying from his severe diabetic complications). Other than the cerebrovascular disease (stroke), he has suffered most of the known diabetic complications, including both macro-vascular & micro-vascular complications, nerve damage (e.g. retinopathy and foot ulcer), as well as some hormone disturbance, e.g. hypothyroidism.

In 2010, he decided to launch his self-study on endocrinology, diabetes, and food nutrition to save his own life. After developing the metabolism model in 2024, during 2015 and 2016, he developed four prediction models related to diabetes conditions: weight, PPG, fasting plasma glucose (FPG), and A1C. As a result, by using his developed mathematical metabolism index (MI) model in 2014 and those 4 prediction tools, by end of 2016, his weight was reduced from 220 lbs. (100 kg, BMI 32.5) to 176 lbs. (89 kg, BMI 26.0), waistline from 44 inches (112 cm) to 33 inches (84 cm), average finger glucose reading from 250 mg/dL to 120 mg/dL, and lab-tested A1C from 10% to ~6.5%. One of his major accomplishments is that he no longer takes any diabetes medications as of 12/8/2015.

Around that time (2014-2017), he started to focus on preventive medicine instead of blindly trusting and depending on medical treatments only. He has also gambled on his own belief that most human organs have the inherent abilities to self-repair themselves through lifestyle improvements (i.e. taking good care of them), even though it can only achieve a certain degree of repairing or healing which depends on different organ cells and their status of damage.

In 2017, he has achieved excellent results on all fronts, especially glucose control. However, during the pre-COVID period of 2018 and 2019, he traveled to approximately 50+ international cities to attend 65+ medical conferences and made ~120 oral presentations. This hectic schedule inflicted damage to his diabetes control, through dining out frequently, post-meal exercise disruption, jet lag, and along with the overall metabolic impact due to his irregular life patterns through a busy travel schedule; therefore, his glucose control and overall metabolism state were somewhat affected during this two-year heavy traveling period.

Since 1/19/2020, living in a COVID-19 quarantined lifestyle, not only has he written and published ~500 medical papers in 100+ journals, but he has also reached his best health conditions in the past 26 years. By the beginning of 2022, his weight was further reduced to 168 lbs. (BMI 24.8) along with a 5.8% A1C value (beginning level of pre-diabetes), without having any medication interventions or insulin injections. During the period from 1/1/2022 to 8/20/2022, his average FPG is 93 mg/dL, PPG is 113 mg/dL, and daily glucose is 106 mg/dL. These good results are due to his non-traveling, low-stress, and regular daily life routines. Of course, the accumulated knowledge of chronic diseases, various complications, practical lifestyle management experiences, and development of many high-tech tools along with his medical research academic findings have contributed to his excellent health status since 1/19/2020, the beginning date of his self-quarantined life.

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. He has maintained the same measurement pattern to the present day. In his research work, he uses his CGM sensor glucose at a time interval of 15 minutes (96 data per day). Incidentally, the average sensor glucoses between 5-minute intervals and 15-minute intervals has only a 0.6% difference (average glucose of 111.86 mg/dL for 5-minutes and average glucose of 111.18 mg/dL for 15-minutes with a correlation of 94% between these two sensor glucose curves) during the period from 2/19/20 to 7/22/22.

Therefore, over the past 13 years, he could study and analyze his collected 3+ million data regarding his health status, medical conditions, and lifestyle details. He applies his knowledge, models, and tools from mathematics, physics, engineering, and computer science to conduct his medical research work. His research work has a goal of achieving both “high precision” and “quantitative proof” in the medical findings for the ultimate objectives of “preventive medicine”.

The following timetable provides a rough sketch of the emphasis in his medical research during each stage:

2000-2013: Self-study diabetes and food nutrition, developing a data collection and analysis software.

2014: Develop a mathematical model of metabolism, using engineering modeling and advanced mathematics.

2015: Weight & FPG prediction models, using neuroscience.

2016: PPG & HbA1C prediction models, using optical physics, artificial intelligence (AI), and neuroscience.

2017: Complications due to macro-vascular research, such as cardiovascular disease (CVD), coronary heart diseases (CHD), and stroke, using pattern analysis and segmentation analysis.

2018: Complications due to micro-vascular research such as kidney (CKD), bladder, foot, and eye issues (DR).

2019: CGM big data analysis, using wave theory, energy theory, frequency domain analysis, quantum mechanics, and AI.

2020: Cancer, dementia, longevity, geriatrics, DR, hypothyroidism, diabetic foot, diabetic fungal infection, and linkage between metabolism and immunity, learning about certain infectious diseases, such as COVID-19.

2021: Applications of linear elastic glucose theory (LEGT) and perturbation theory from quantum mechanics on medical research subjects, such as chronic diseases and their complications, cancer, and dementia.

2022: Applications of viscoelastic/viscoplastic glucose theory (LEGT) on 128 biomedical research cases and 5 economics research cases.

Again, to date, he has spent ~40,000 hours self-studying and researching medicine and he has read 3,000+ published medical papers online. He has collected and calculated more than three million pieces of data regarding his own medical conditions and lifestyle details. In addition, he has written and published 700+ medical research papers in 100+ various medicine, physics, mathematics, and engineering journals. Moreover, he has also given 120+ presentations at 70+ international medical conferences. He has continuously dedicated his time (11-12 hours per day and work each day of a year, without rest during the past 13 years) and efforts to his medical research work and shared his findings and learnings with other patients worldwide. In addition, he has also spent the past 12 years developing and maintaining a medical and health software APP on his iPhone which functions as his private numerical laboratory to process the various experimental datasets of his medical conditions and lifestyle details.

2.2 Brief introduction of math-physical medicine (MPM) research

The author has collected 3+ million data regarding his health condition and lifestyle details over the past 13 years. He spent the entire year of 2014 developing a metabolism index (MI) model using a topology concept, nonlinear algebra, algebraic geometry, and finite element method. This MI model contains various measured biomarkers and recorded lifestyle details along with their induced new biomedical variables for an additional ~1.5 million data. Detailed data of his body weight, glucose, blood pressure, heart rate, blood lipids, body temperature, and blood oxygen level, along with important lifestyle details, including diet, exercise, sleep, stress, water intake, and daily life routines are included in the MI database. In addition, these lifestyle details also include some lifetime bad habits and certain environmental exposures. Fortunately, the author has none of these lifetime bad habits and an extremely low degree of exposure to environmental factors. The developed MI model has a total of 10 categories covering approximately 500 detailed elements that constitute his defined "metabolism index model" which are the building blocks or root causes for diabetes and other chronic disease-induced complications, including but not limited to cardiovascular disease (CVD), chronic heart disease (CHD), stroke, chronic kidney disease (CKD), diabetic retinopathy (DR), neuropathy, foot ulcer, hypothyroidism, dementia, and various cancers. The end result of the MI development work is a combined MI value within any selected period with 73.5% as its dividing line between a healthy and unhealthy state. The MI serves as the foundation for many of his follow-up medical research work.

During the period from 2015 to 2017, he focused his research on type 2 diabetes (T2D), especially glucose, including fasting plasma glucose (FPG), PPG, estimated average glucose (eAG), and hemoglobin A1C (HbA1C). During the following period from 2018 to 2022, he concentrated on researching medical complications resulting from diabetes, chronic diseases, and metabolic disorders which include heart problems, stroke, kidney problems, retinopathy, neuropathy, foot ulcer, diabetic skin fungal infection, hypothyroidism, diabetic constipation, dementia, and various cancers. He also developed a few mathematical risk models to calculate the probability percentages of developing various diabetic complications based on this MI model. From his previous medical research work with 700+ published papers, he has identified and learned that the associated energy of both obesity and hyperglycemia is the primary source of many diabetic complications which lead to death. Therefore, a thorough knowledge of these energies is important for achieving a better understanding of the dangerous complications.

2.3 TD, SD, and FD analysis tools

This section has brief descriptions of TD correlation analysis with other observational results, SD VGT analysis with hysteresis loop area's energy results, and FD analysis with frequency curve area's energy results.

First of all, by using a TD analysis tool, we can examine the curves' moving trend and pattern visually along with their correlation numerically. We can also study the extremely high or low data values in the dataset. The visual observation or calculation-derived interpretations are a part of statistical analysis results which can indeed provide some useful hints or even derive some accurate conclusions. However, we must be aware of the limitations of the selected data size and time window and also be cautious of the appropriate statistics tool we choose.

The author would like to describe the essence of his developed "hybrid model" that combines both the SD viscoelastic/plastic VGT analysis method and FD fast Fourier transform (FFT) analysis method together with a comparison against the traditional time-domain statistical correlation analysis.

It is described in 10 steps in the English language instead of using mathematical equations to explain it. In this article, he has applied both the SD-VGT operations (steps 1-7) and the FD-FFT operations (steps 8-10). As a result, it is aimed at readers who do not have an extensive background in those academic subjects of engineering, physics & mathematics.

The first step is to collect the output data or symptom (strain or ε) on a time scale. The second step is to calculate the output change rate with time (dε/dt), i.e. the change rate of strain or symptom over each period. The third step is to gather the input data or cause (viscosity or η) on a time scale. The fourth step is to calculate the time-dependent input or cause (time-dependent stress or σ) by multiplying dε/dt and η together. The "time-dependent input or cause equation" of "stress σ = strain change rate of dε/dt * viscosity η" is the essential part of this "time dependency". The fifth step is to plot the input-output (i.e. stress-strain or cause-symptom) curve in a two-dimensional space-domain or SD (x-axis versus y-axis) with strain (output or symptom) on the x-axis and stresses (time-dependent inputs, causes, or stresses) on the y-axis.

The sixth step is to calculate the total enclosed area within these stress-strain curves or input-output curves (i.e. the hysteresis loops), which is also an indicator of associated energies (either created energy or dissipated energy) of this input and output dataset. These energy values can also be considered as the degrees of influence on output by inputs. The seventh step is the assembly of the area values of the selected periods to compare the "historical progression and contribution of medical condition" over certain periods. For the frequency domain, the eighth step is to define a "hybrid input variable" by using "strain*stress" which yields another accurate estimation of energy ratio similar to the SD-VGT energy ratio associated with the hysteresis loop. The ninth step is to present these hybrid models' results of (strain*stress) in TD and then perform the fast Fourier transformation (FFT) operation to convert them into an FD. The enclosed area of the frequency curve (where the x-axis is the frequency and the y-axis is the amplitude of energy) can be used to estimate the total FD-FFT energy. The tenth step is to compare these FD energy results against the SD-VGT energy results, or even TD energy results.

After providing the above 10-step description, the author would still like to use the following set of VGT stress-strain mathematical equations in a two-dimensional SD to address the selected medical variables:

Strain
= ε (time-dependency characteristics of individual strain value at the present time duration)

Stress
= σ (based on the change rate of strain multiplying with a chosen viscosity factor η)
= η * (dε/dt)
= η * (d-strain/d-time)
= (viscosity factor η using individual viscosity factor at present time duration) * (strain at present quarter - strain at previous time duration)

Some of these inputs (causes or viscosity factors) are further normalized by dividing them or being divided by a normalization factor using certain established health standards or medical pieces of knowledge. Some examples of normalization factors are 6.0 for HbA1C, 120 mg/dL for glucose, 25 for body mass index (BMI), 4,000 steps after each meal, 10,000 or 12,000 steps for daily walking exercise depending on time-period selection, 13 grams to 20 grams of carbs/sugar intake amount per meal depends on time-period selection. If using the originally collected data, i.e. the non-normalized data would distort the numerical comparison of the hysteresis loop areas. Using this "normalization process", we can remove the dependency of the individual unit or certain unique characteristics associated with each viscosity factor. This process allows us to convert the originally collected variables into a set of "dimensionless variables" for easier numerical comparison and result interpretation.

In this particular study, his selected normalization factors for MI scores, CVD risk, CKD risk, and Cancer risk are 1. These 3 diseases' risk probability % are developed based on his developed metabolism index (MI) model which is normalized on the same scales already.

Note: For a more detailed description, please refer to the "consolidated method" section which is given at the beginning of the special issue.

3. RESULTS

Figure 1 depicts his TD diagrams of symptom (health age) versus causes, including 4 lifestyle details (exercise, diet, sleep, stress), 4 chronic conditions (weight, glucose, blood pressure, lipids), and 3 deadly diseases (CVD, CKD, Cancer).

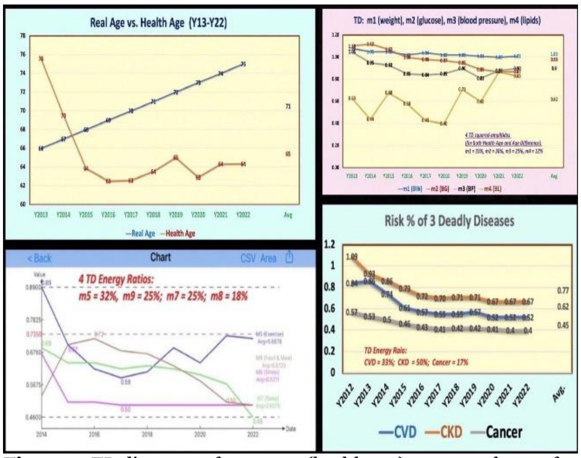

Figure 1: TD diagrams of symptom (health age) versus pathway of causes, including 4 lifestyle details (exercise, diet, sleep, stress), 4 chronic conditions (weight, glucose, blood pressure, lipids), and 3 deadly diseases (CVD, CKD, Cancer).

Figure 2 shows his SD-VGT energy analysis results of longevity versus 4 key lifestyle details.

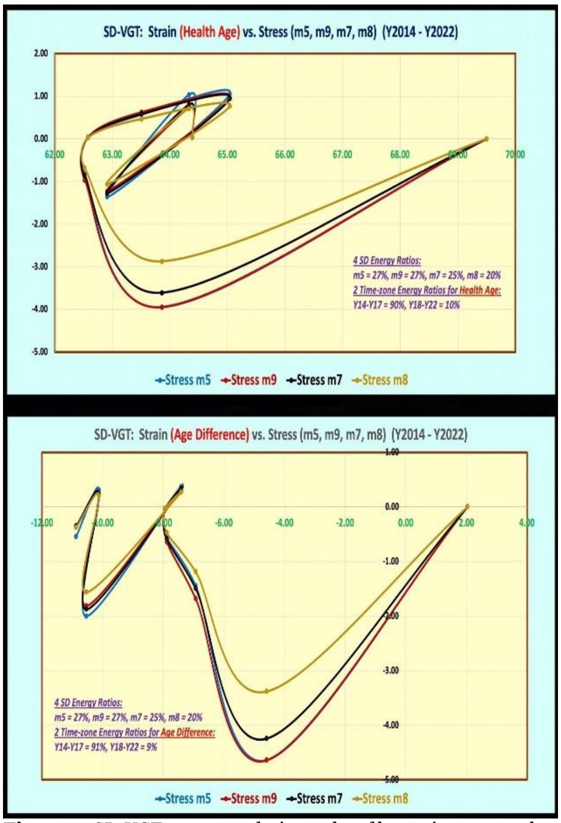

Figure 2: SD-VGT energy analysis results of longevity versus 4 key lifestyle details, m5, m9, m7, m8.

Figure 3 shows his SD-VGT energy analysis results of longevity versus 4 chronic conditions.

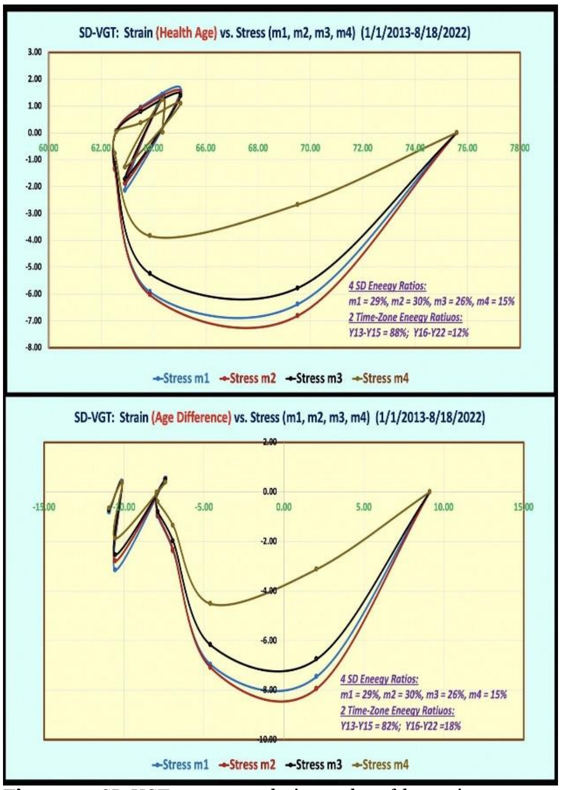

Figure 3: SD-VGT energy analysis results of longevity versus 4 chronic conditions, m1, m2, m3, m4.

Figure 4 shows his SD-VGT energy analysis results of longevity versus 3 deadly diseases.

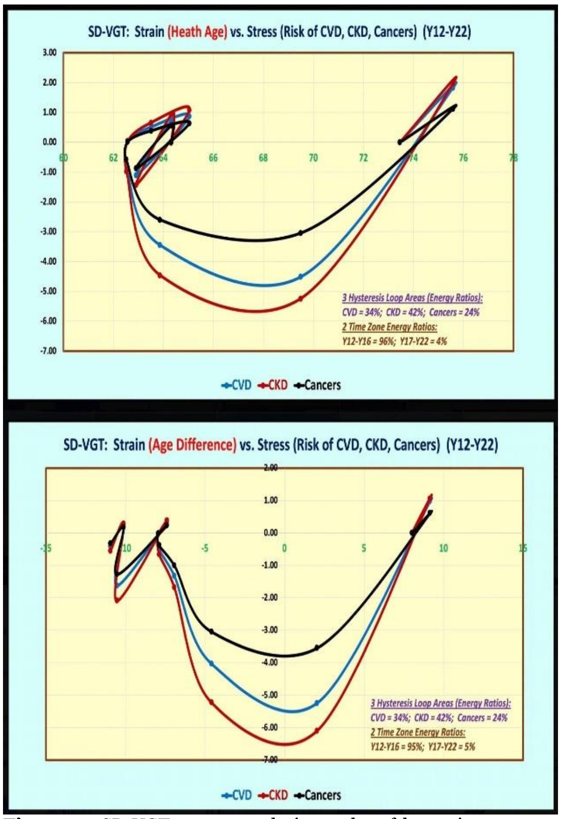

Figure 4: SD-VGT energy analysis results of longevity versus 3 deadly diseases, CVD, CKD, and cancers.

4. CONCLUSION

The author decides to use the SD-VGT analysis results as the backbone of this summarized illustration of observations and interpretations of results for the longevity study.

(1) To summarize the 4 key elements in the lifestyle management category, he started from eating unhealthy foods and consuming more than 100% meal amount (100% is defined as his overall past meal average amount), the daily walking exercise of fewer than 3,000 steps (1.2 mile or 2 km), sleeping around 4 to 6 hours with 4-5 wake-up times at night (due to his kidney problems and bladder infection), with a higher level of stress (left-over stress or ripple effect from his previous high-tech executive job). Starting in 2022, he has strictly followed the Mediterranean diet style with only ~50% of his previous meal's amount, the daily walking exercise of more than 15,000 steps (6 miles or 10 km), sleeping around 7 to 8 hours with 0-1 wake-up time at night, with the lowest possible level of stress which he has no significant health problems, no financial issues, no inter-personnel conflicts, and no work-related stress (his medical research work is not aimed at fame, power, or money - only a purely personal interest of saving his own life). His SD-VGT analysis results of lifestyle details have confirmed the above description. His SD energy ratios for "health age case are: m5 exercise = 27%; m9 food = 27%; m7 sleep = 25%; m8 stress = 20%. It is clear that both exercise and food have a higher degree of influence on his longevity. Sleep is placed slightly behind exercise and food. Stress has the least amount of influence on his longevity since his performance level has been excellent within his selected time frame. Therefore, he should continuously watch out for his physical exercise and food/diet which have a direct link with his body weight and glucose level. Both body weight and glucose are important factors for their induced medical complications.

(2) From the SD-VGT analysis results of lifestyle details, the author has also analyzed the energy's time-zone process of "energy within earlier 4 years of 2014 to 2017 versus energy within recent 5 years of 2018 to 2022". For the "health age" case: Y14-Y17 = 90%; Y18-Y22 = 10%. We can see that most

influences (90%) on his health age happened during the first 4 years, i.e. Y14-Y17. After the earlier 4-year period, his lifestyle details contribute only 10% to his health age during the recent 5 years of Y18-Y22, and his health age fluctuated around 64 years despite his linearly increased biological real age each year.

(3) To summarize the 4 key elements of the chronic medical condition category, he started from his body weight at 220 lbs (BMI 32), averaged daily glucose at 280 mg/dL (HbA1C at 10%), hypertension in 2014, and hyperlipidemia in 2010. By the year 2022, he has reduced his body weight to 170 lbs (BMI 25), his average daily averaged glucose at 106 mg/dL (HbA1C at 5.8%) without taking any diabetes medication, and no signs of hypertension and hyperlipidemia as well. His SD-VGT analysis results of chronic conditions have confirmed the above descriptions. The SD energy ratios for "health age" case are: m1 body weight = 29%; m2 glucose = 30%; m3 blood pressure = 26%; and m4 lipids = 15%. It is clear that his body weight and glucose have higher degrees of influence on his longevity than his blood pressure and lipids. Therefore, he should continuously place more attention and have better control in future years on his body weight and glucose.

(4) From the SD-VGT analysis results of chronic conditions, the author has further analyzed the energy's time-zone process of "energy within earlier 3 years of 2013 to 2015 versus energy within the recent 7 years of 2016 to 2022". The SD time-zone energy ratios for "health age" case are: Y13-Y15 = 88%; Y16-Y22 = 12%. We can see that most influences (88%) on his health age happened during the first 3 years, i.e. Y13-Y15. After the earlier 3-year period, his chronic conditions contributes only 12% to his health age during the recent 7 years of Y16-Y22, and his health age fluctuated around 64 years despite his linearly increased biological real age each year.

(5) Although the author suffered from 5 cardiac episodes during 1994-2004, he did not endure additional heart problems since 2005 (note: He sold his high-tech business in 2001 and left the high-stress money-making business.) In addition, he was diagnosed with a kidney issue in 2010, but his kidney condition has greatly improved since then. Thus far, he has never been diagnosed with any sign of cancer. This study covers only the period of 10+ years from 2012 through 2022; therefore, his CKD risk's influence should be stronger than the CVD risk's influence due to the time proximity of his kidney problem compared to the heart problems in much earlier years. As a result, the 3 deadly diseases' contribution levels should be ranked in the following order: "CKD is higher than CVD, and CVD is higher than Cancer". From the SD-VGT analysis results of 3 deadly diseases, the SD energy ratios for "health age" case are: CVD = 34%; CKD = 42%; and Cancer = 24%. These quantitative results of his SD energy analysis have matched with the above-guessed outcomes.

(6) From the SD-VGT analysis results of 3 deadly diseases, the author has further analyzed the energies within two different time zones of the earlier 5 years from 2012 to 2016 versus the recent 6 years from 2017 to 2022. The SD time-zone energy ratios for the "health age" case are: Y12-Y16 = 96%; Y17-Y22 = 4%. We can see that most influences (96%) from 3 deadly diseases on his health age happened during the first 5 years, i.e. Y12-Y16. After the earlier 5-year period, his 3 deadly diseases contribute only 4% to his health age during the recent 6 years of Y17-Y22, and his health age fluctuated around 64 years despite his linearly increased biological real age each year.

In summary, from the results of the 3 separate SD-VGT analyses of lifestyles, chronic conditions, and deadly diseases, it is clear that his CKD risk contributes the most to his longevity, the CVD risk is the next significant disease, while the Cancer risk contributes the least on his longevity concerns. Furthermore, these 3 deadly disease risks have resulted from his 4 chronic conditions where body weight and glucose contribute more on his longevity than blood pressure and blood lipids. Finally, the 4 chronic conditions have directly resulted from his 4 key lifestyle details which food/diet and physical exercise contribute the most and more than sleep and stress. Of course, these values of energy ratio must be interpreted properly using the particular patient's health history, and current medical conditions, along with personal information of the patient's lifestyle details. It should be noted that the word "cause's contribution" can also be interpreted as the "risk on symptom".

Although this longevity study has used the author's own data, the concept behind "health age" is almost identical to the "epigenetic age" mentioned in other medical reports. He strongly believes that this longevity study can indeed serve as a useful tool to prolong his own lifespan with a healthy way of life. If and when he lives up to 95 years old of age in a healthy way, he can then ultimately prove the validity of this longevity theory and practice (academically, happiness is a separate issue which is more related to psychology). Other patients can also learn from his research findings and follow his example to improve their prospects of healthy longevity.

The research methodology in this particular study has offered a subtle and deeper understanding of the complicated biophysical behaviors of longevity. In addition, it has further proven the usefulness of his developed math-physical medical research methodology for biomedical research.

5. REFERENCES

For editing purposes, the 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.

Gerald C. Hsu
Curriculum Vitae

The author received an honorary Ph.D. in mathematics and majored in engineering at MIT. He attended 7 different universities and studied 7 academic disciplines over 17 years. Furthermore, he spent another 22 years self-studying internal medicine, food nutrition, and psychology. Since 2010, he has spent more than 40,000 hours self-studying and researching medicine by following the main route of metabolism and expanding into endocrinology, diabetes, and its complications including cardiology, nephrology, neurology, ophthalmology, and more. Since 2019, he further extended his research into oncology, along with geriatrics and dementia, focusing on longevity based on metabolism improvements.

His research methodology is math-physical medicine which focuses on "quantitative and precision".

To date, he has written and published more than 720 medical papers in 100+ medical journals. In addition, he published 10 special editions in 5 journals and 6 medical books through Amazon.

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Viscoelastic and Viscoplastic Glucose Theory Application in Medicine

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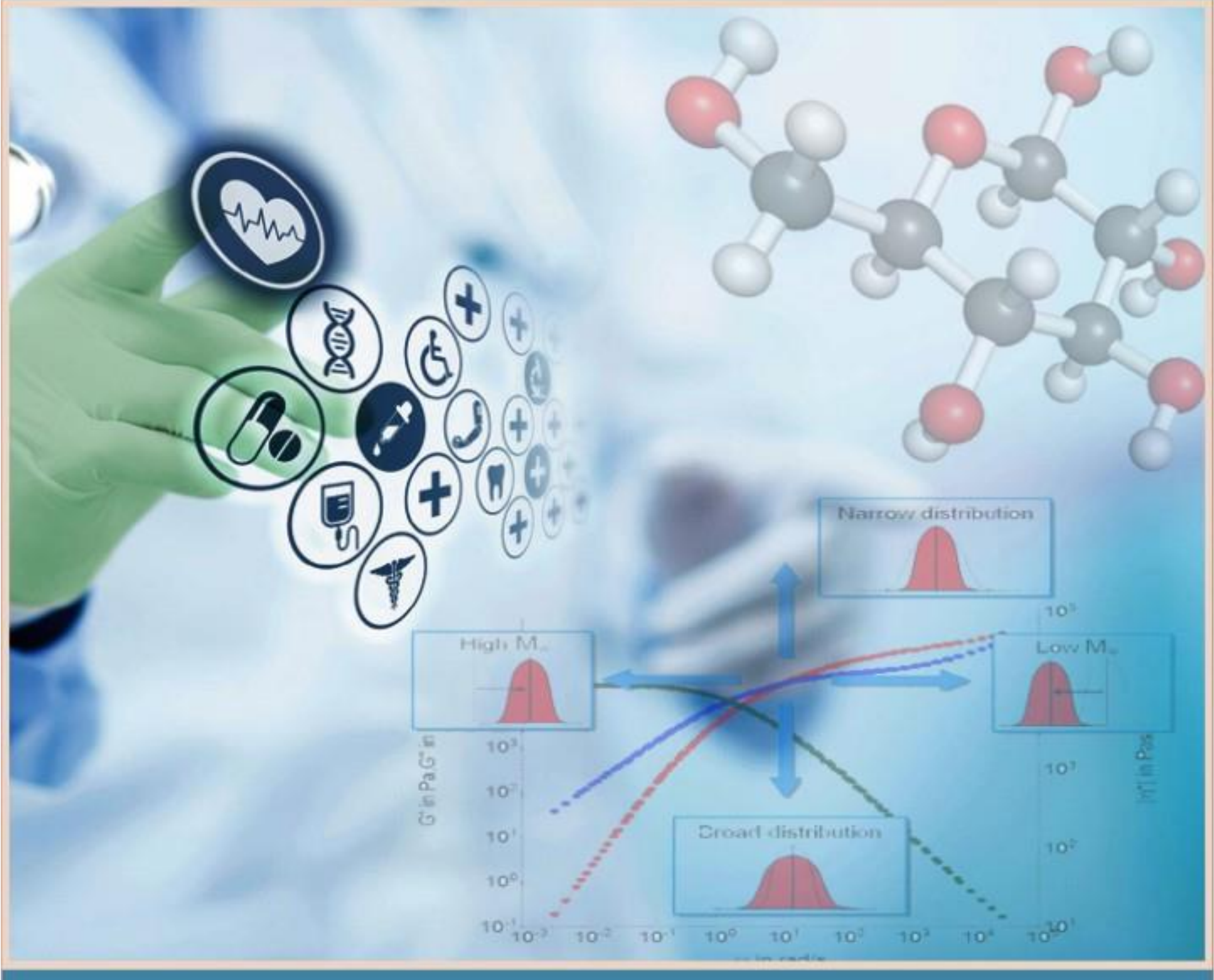

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