



INTRODUCING

SMART SUGARS

**Sugars that Speak.
*Why we should listen!***

JC Spencer

Profits from the sale of this book are used for continuing education and Glycomics research.

This page is intentionally left blank.

INTRODUCING

Smart Sugars

**Sugars that Speak.
Why we should listen!**

JC Spencer

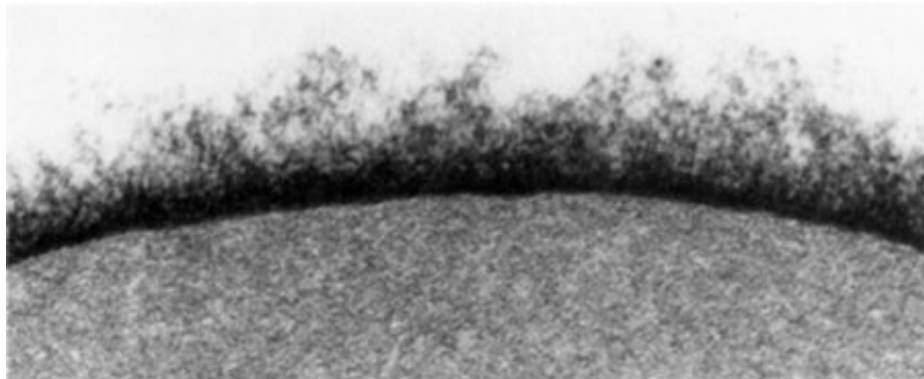
\$29.97

Profits from the sale of this book are used for continuing Glycomics education and research.

This page is intentionally left blank.

Smart Sugars
have inside information
which can change your life.

GLYCOSCIENCE



aka Glycomics and Glycobiology
SCIENCE OF SUGARS

About the picture

Glycoprotein receptor sites coat the surface of a red blood cell.

This glycan layer shows the physical structure of the operating system (OS) of all cellular communication.

Source: National Research Council of the National Academies

Transforming Glycoscience - A Roadmap for the Future

supplied by Voet and Voet, Biochemistry,
John Wiley and Sons, Inc. and used by permission.

Preface

Scientists have discovered many health benefits related to the study of Glycoscience or Glycomics (smart sugars). The Endowment for Medical Research, Inc., a non-profit scientific research and educational public charity, is committed to education of this science and to provide that education to healthcare professionals and the general public worldwide. This educational effort, including Introducing Smart Sugars, was encouraged by the National Research Council of the National Academies. Major U.S. Government agencies that recognize the major benefits of "Smart Sugars" recently formed a committee to assess the importance and impact of Glycomics and Glycosciences.

The project, Transforming Glycoscience - A Roadmap for the Future, was approved by the Governing Board of the National Research Council, whose members were drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The project was supported by the National Institutes of Health, the National Science Foundation, the Food and Drug Administration, the Howard Hughes Medical Institute, and the U.S. Department of Energy. The group was charged to "articulate a unified vision for the field on Glycoscience and Glycomics" and to "develop a roadmap with concrete research goals to significantly advance the field."

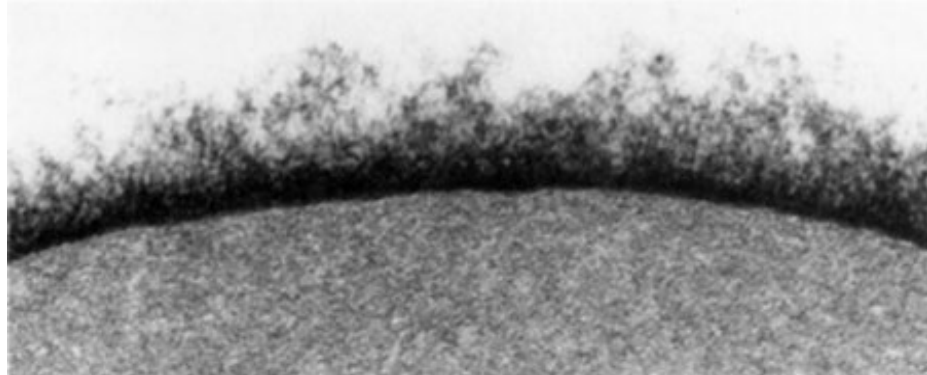
On the website www.GlycoscienceNews.com sponsored by The Endowment for Medical Research, Inc., you can learn how Glycoscience is the science that will change the way we live. Reports on the work of the committee and ongoing Glycomics research will keep readers informed with an easy-to-understand format. The mission is to make it easy for the public to understand Glycoscience that may be thousands of times more complex than the genome project.

The committee for the project, Transforming Glycoscience - A Roadmap for the Future, CONCLUDED that integrating glycoscience into relevant disciplines in high school, undergraduate, and graduate education, and developing curricula and standardized testing for science competency will increase public as well as professional awareness.

Table of Contents

Preface	4
Table of Contents	5
Introduction	6
Chapter One What are Smart Sugars	9
Chapter Two Glycomics Holds the Answer to Cancer for Prevention, Diagnosis, and Treatment	17
Chapter Three Glycoscience Meets Quantum Physics	21
Additional Glycoscience Reading and Training Materials	23
Glossary	26

Introduction



© Copyright permission granted to The Endowment for Medical Research, Inc. and may not be copied or reproduced in any form.

You are looking at glycoprotein receptor sites on the surface of a red blood cell. This glycan layer is more than just the operating system (OS) of all cellular communication for the body. The Smart Sugars, the building blocks of the glycan layer, give LIFE to the cell.

Like thick fuzz on a peach, healthy cells are coated with these Smart Sugars. Unhealthy cells have less dense glycans or, as on cancer cells, the polysaccharides are missing altogether, leaving the cells bald, toxic, and infectious. Medical scientists agree that the Gold Standard for future medical diagnostics, especially for cancer, will be to analyze the quantity and quality of these sugar molecules.

The purpose of Introducing Smart Sugars is to provide a starting point for all people to learn about the imminent paradigm shift in medicine and healthcare. Super Sugars are evidence-based and the results are in the facts. The facts that have emerged from research are nothing short of amazing.

The future of medicine and healthcare is Glycoscience. Undeniably, scientists agree that the explosive technological advances in Glycoscience will transform medicine and healthcare. Additionally, Glycoscience has the potential to dramatically reduce healthcare costs.

Glycoscience is entering mainstream medicine and was declared by MIT as
**“ONE OF THE 10 EMERGING TECHNOLOGIES
THAT WILL CHANGE THE WORLD.”**

Working together, The National Institutes of Health (NIH), the Food and Drug Administration (FDA), the National Science Foundation (NSF), the National Research Council, the National Academy of Sciences, the Howard Hughes Medical Institute, and the U.S. Department of Energy (DOE), formed a committee to evaluate the importance, impact, and future of Glycoscience. The group was charged to “articulate a unified vision for the field on Glycoscience and Glycomics” and to “develop a roadmap with concrete research goals to significantly advance the field.” We will report on the committee and keep our readers informed with an easy to understand format.

It is exciting for these significant agencies to request Glycoscience be taught in high school science classes as well as undergraduate and graduate education. This will assure that the next generation will know about the science.

www.GlycoscienceNEWS.com will provide a glimpse of the Glycoscience of tomorrow and how the future of the human race will be enriched in ways only dreamed of before. Here, we will articulate with expectancy where Glycoscience can take us today and tomorrow.

Most Smart Sugars are not known to the public, are not sweet, and are extremely beneficial to good health. These specific sugars, often called glyconutrients, are unique. Contrary to common thought, glyconutrients are functional beyond just supplying energy to the body. Your body uses these sugar building blocks to construct the actual operating system (OS) of every cell.

The sugars and sweeteners consumed by Westerners, such as table sugar (sucrose) and synthetic sweeteners, lower the quality of health and contribute to obesity, diabetes, and other diseases plaguing humans. Bad sugars and sweeteners weaken the immune system and all the other vital functions of the body. The really good sugars, which I call “Royal Sugars”, or “Smart Sugars” as discussed in this book, can actually help modulate your immune system and balance your hormones which is vital to your health and longevity.

Prior to fifty or so years ago our ancestors ate more unprocessed foods and natural sweeteners containing Smart Sugars. Today our foods are depleted of many nutrients and necessary Smart Sugars. It is more important today than ever to supplement our diets with these beneficial functional sugars and with natural vitamins and minerals.

The answer to the healthcare crisis is to maintain good health through prevention. A strong, well modulated immune system and well functioning endocrine system are vital to your health and longevity.

Chapter One

What Are Smart Sugars?

The children of today are not expected to live as long as their parents lived nor be as healthy as their parents. This is alarming! Premature aging and the diseases associated with aging are appearing in our children in unprecedented numbers. Paradoxically, new discoveries in Glycoscience suggest it is possible to live in good health longer than previous generations.

Everyone wants to be healthy, but once people face serious health challenges, it is often too late to reverse the effects of years of aging and damage at the cellular level. Therefore, the earlier in life good health habits are instilled, the better long-term quality of life a person should have.

Some researchers, like George S. Roth, PhD, believe we can live a vibrant, healthy life to the age of 150 if we make the right choices, eat right, maintain a high pH, exercise properly and keep our minds alert. Dr. Roth, who is author of The Truth About Aging and former researcher for the National Institute on Aging, is optimistic with his words, *“In addition to eliminating a lot of the diseases of aging, we’ll maintain function, vitality, cognition and all the other things we value in terms of quality of life.”* In March 2001, *Science* magazine dedicated twelve articles (3/2001) to educating its science and medical readers about functional sugars.

In the 1980s, Bill McAnalley, PhD, a pharmacologist and toxicologist, discovered the first known sugar with medicinal benefits, the beta-mannan molecule. Earlier research conducted by Clarence “Lush” Lushbaugh, MD, PhD, for the Atomic Energy Commission in 1952, pointed Dr. McAnalley toward the beta-mannan molecule.

The beta-mannan sugar molecule is a phytonutrient found in certain plants. It is the functional component in Aloe Vera but is destroyed shortly after the leaf is harvested. The fact that an enzyme begins breaking down the long chain mucilaginous polysaccharide beta-mannan sugar molecule resulted in thousands of contradictory published papers. Some researchers were using fresh Aloe Vera that proved beneficial and some were using leaves that were a few hours or days old that had no beneficial effect.

In the 1980s, Bill McAnalley began his search to isolate the functional component in Aloe Vera after studying a paper written by Clarence C

Lushbaugh, MD, PhD. In 1949, Lush, as he liked to be called, became a pathologist at the Los Alamos Medical Center in New Mexico and a staff member in the Biomedical Research Group of the Los Alamos Scientific Laboratory.

Dr. Lushbaugh was a pathfinder in forensic pathology. He studied the rate of body cooling to use in estimating the time of death and published a report of his findings in a law-enforcement publication that became known as the Lushbaugh method. Lush authored or coauthored more than 150 scientific papers and book chapters.

The Atomic Energy Commission was seeking a way to treat radiation burns in humans. Dr. Lushbaugh conducted research on experimental animals with his focus on biochemical changes in irradiated skin. His rabbits concealed a valuable secret until Dr. McAnalley solved the mystery years later.

In 1952, having become internationally known as an authority on radiation accident victims, he tested Aloe Vera on rabbits with six beta radiation burns. He placed fresh Aloe Vera on two of the burns, week-old Aloe Vera on two of the burns and the other two burns were the control burns that received no treatment. To his amazement, the two beta radiation burns treated with fresh Aloe Vera fillet healed completely to new rabbit pink skin. The two burns treated with the week-old Aloe Vera did no better than the two control burns that received no treatment.

The Atomic Energy Commission was looking for something they could store in bomb fall-out shelters to treat people with atomic radiation burns. Dr. Lushbaugh found it, but could not preserve it. More than thirty-five years later, Dr. McAnalley, after reading Lush's report, was attempting to discover what the functional component was, thinking it was a protein.

One day, almost on a whim, Dr. McAnalley placed some fresh Aloe Vera in a microwave and "nuked" it. The message the "nuked" Aloe delivered to Dr. McAnalley was that the functional component was, indeed, not a protein, but a carbohydrate, a sugar. He knew if the functional component were a protein, it would have been destroyed by the microwave. But, it was not destroyed. It was still functional. Because the beta-mannan molecule was a sugar, the

medical world scoffed at the discovery of a “beneficial sugar pill”. Medical scientists, steeped in pharmaceutical education, could not accept the fact that a sugar had any functionality other than for storing energy.

It has been a long time coming, but today, the mainstream medical community is beginning to grasp the profound validity of Glycoscience. More than half a century after Dr Lushbaugh’s paper, Glycomics is the new frontier of medical science. Dr. Lushbaugh died at age 84 on October 13, 2000 from Alzheimer’s disease.

The National Library of Medicine cites more than 600,000 (yes, that is six hundred thousand) references to published papers on glycoproteins. Scientists are adding so many new research papers each day (thousands per month) that no one can adequately keep up with the progress of Glycomics.

How these sugars bond together and to other molecules is critical to their function. All successful systems utilize a structure design and have a function. Chaos happens when the design and function do not fit the system. The system of the cell is corrupt without Smart Sugars. Humans unknowingly depend on these sugars for life for cell to cell communication through complex electrical and chemical signals. Smart Sugars read and transcribe DNA and make the determination of blood type.

An exciting facet of glycobiology is found in the blood. While there are four basic blood types: A, B, AB and O, there are thirty human blood group systems and 600 known antigens besides A and B that characterize the proteins discovered on a human red blood cell. Each of these thirty blood types is a classification of blood based on the presence or absence of inherited antigenic substances on the surface of the red blood cells. These antigens may be proteins, sugars (glyco), glycoproteins, or glycolipids. How these sugars are arranged determines the blood type.

A fact that is wonderfully amazing to me is that Smart Sugar glyconutrients are abundant in mother’s breast milk and the new born baby needs these for preventing infections. Research papers have documented children who received glyconutrients from breast milk were healthier and even made better

test scores later on in college than the children who did not receive these sugars.

Oxford University advanced the science of sugars, and in 1988, Oxford Professor Raymond Dwek coined the term “glycobiology”, which is widely used today. Scientists have identified about twenty Smart Sugars found in nature. Here is a brief look at five of these Smart Sugars.

- **mannose:** Studies show that mannose has remarkable health benefits, especially involving the immune system, cognitive functions, and cancer. Humans are dependant upon it. Mannose is cited by the National Library of Medicine for over 25,000 references with more than 2,000 linked to cancer research. (Reference: NIH public website, www.PubMed.gov)
- **fuco****se:** (not to be confused with fructose) Fucose, has major health benefits, may prevent and treat cancer, and the National Library of Medicine cites over 9,000 references with over 1,200 linked to studies in cancer research. (Reference: NIH public website, www.PubMed.gov)
- **trehalose:** The unique bond of two glucose molecules. Trehalose is able to protect the integrity of cells against a variety of environmental stresses such as desiccation, dehydration, heat, cold and oxidation. It is a non-reducing sugar with its non-reducing end to the left that is not easily hydrolyzed by acid. Trehalose has a functionality that aids in the proper folding of proteins. Over 5,200 references are cited by the National Library of Medicine linked to research. (Reference: NIH public website, www.PubMed.gov)
- **galactose:** Studies show that galactose has health benefits, humans are dependant upon it, and over 31,000 references are cited by the National Library of Medicine linked to research. (Reference: NIH public website, www.PubMed.gov)
- **glucose:** The medical establishment recognizes the basic sugar glucose as very important to life. However, it appears to be the most harmful in large quantities, especially for diabetics. Glucose is used in solution to treat nearly everyone in hospitals. (Reference: NIH public website, www.PubMed.gov)

Researchers are giving the class of Smart Sugars serious exploration. More physicians are beginning to incorporate these sugars into their practice and more individuals are ingesting these natural sugars. Drug companies are rushing to synthesize these sugars into new drugs. Many thousands of patents related to these super sugars have been issued, most since 1995.

We are presently aware of a small but growing number of very significant super sugars. Eight of these sugars were presented by Robert K. Murray, MD, PhD, and published in multiple editions of Harper's Biochemistry.

It has become evident and scientists have concluded that super sugars have efficacy individually and synergistically to build cells, coat cells, strengthen cells and cell membrane. Smart Sugars become proficient with other cells to form the whole neurological mental and motor systems that operate the human body.

In short, these super sugars provide quality of life. Without them, you would have no life. Some scientists have debated that your body can produce all of these sugars without ingesting them if you initially only have glucose in your body. It is theoretically correct that your body could manufacture the other sugars from just one. It is a fact, however, that while your body has the potential ability to manufacture them, your body does not manufacture enough because of the time and energy required and the enzymatic gymnastics necessary.

Some of these sugars are very expensive in pure form and the benefits of each sugar are still under investigation. Glycomics research is ongoing in universities around the world. The Endowment for Medical Research has supplied sugars to universities and research labs in at least six countries and conducted Pilot Surveys in three countries.

Here is a partial list of significant sugars. While I have listed twenty three sugars here, there may be many more unique sugar structures yet to be discovered. An ever-so-slight change in the sugar structure provides a unique functionality that may distinguish it as a new sugar with a unique function. A more exhaustive study of these sugars can be found in my other books.

- fucose (not to be confused with fructose)
- L-fucose
- D-fucose
- galactose
- glucose
- mannose
- arabinose
- GDP-alpha-D-mannose
- xylose
- trehalose
- rhamnose
- melibiose
- n-acetylneuraminic acid
- ribose
- GDP-fucose
- D-mannose
- galactosamine
- glucosamine
- GDP-mannose
- D-arabinose
- n-acetylgalactosamine
- n-acetylglucosamine
- n-acetyl-d-galactosamine
- l-rhamnose
- sialyllactose
- lactose
- D-ribose

Families are finding that trehalose sugar is probably easiest to use of all of the Smart Sugars because unlike most functional sugars which are not sweet, this sugar has a delightful sweet taste. Families simply exchange what is in their sugar bowl for Trehalose. It looks like regular table sugar and pours better than regular table sugar. While not quite as sweet, it has a more pleasant, clean taste with no aftertaste.

The news is just starting to get out about these healthy sugars and you are among the first to know. Discovering and using Smart Sugars can help improve long-term wellness for us and that of our children and grandchildren. Glycoscience holds the key for us to live a longer, better quality, vibrant life.

Because all of us are most likely deficient in most of the Smart Sugars, my wife and I personally consume a variety of glyconutrients daily and believe that we are the healthier for doing so. My wife (64) (she gave me permission to tell you her age) and I (73) are on no medication and never expect to be. I have more energy and especially seem to be more mentally alert from eating Smart Sugars every day. Functional sugars can be purchased from health food stores, nutritional companies, online stores, or product distributors.

A caution about aloe products: Remember the story of Dr. Lushbaugh? The functional mannose molecule is destroyed by enzymes shortly after the leaf

is harvested. Years ago, the FDA almost shut down the aloe industry because the functional mannose was missing in most aloe products they tested from health store shelves. Purchase your Smart Sugars from a reputable company that has stabilized the functional sugar molecule and preferably from one with a money back guarantee.

Chapter Two

**Glycomics Holds the
Answer to Cancer
for Prevention, Diagnosis, and Treatment**

Glycoproteins are now proven to be the bull's eye, the Rosetta Stone, the Holy Grail, of medicine and of all healthcare. Everything points to accelerated and expanded glycoprotein research, and rightfully so.

In 2008, I reported on developments for measuring glycoproteins which will become the Gold Standard for medical diagnostics. *Science Daily* published a story of detecting early forms of cancer by analyzing the structure of specific sugar molecules. Another report revealed a serum Glycomics approach to Find Biomarkers for Breast Cancer.

A NIH Glycomics cancer study through NCI (National Cancer Institute) in cooperation with the Alliance of Glycobiologists and various universities was initiated in 2007. Funding was \$3.2 million per year for a number of years. In this chapter, we look at the conclusion of that research.

The report states, "Most FDA-approved cancer biomarkers are glycoproteins", but little is known about how their glycan structures are altered in cancer where diagnostic performance could be greatly improved. This experimental data is available at MIT.

The purpose for the study was to attract special scientists to exploit fundamental aspects of cancer biology, and to establish a core of integrated glycobiologists to facilitate the development of cancer glycobiology for presentation and diagnostic applications.

One point in the report said that incentives are needed to attract the leading glycobiologist experts to do cancer research with defined clinical goals. The problem, according to the report, is that traditional funding mechanisms are not suited for an emerging field.

The Mission of the NIH/NCI study was to elucidate the structure and function of glycans that contribute to oncogenesis. And, to exploit aberrant glycosylation in cancer for the development of translational applications for cancer prevention, detection, and diagnosis.

Translation: "Why does poor glycosylation contribute to cancer and what can we do about it?"

In 2007, Texas voters approved a \$3 billion cancer research program. This has further equipped Houston as the hot bed of cancer research in the United States. The Houston Chronicle's front page headline on 06/02/2011 was "City Attracts Big Guns in Fight Against Cancer."

This influx of talent is a game changer for fighting cancer. The best and brightest are coming to Texas and Houston. These established researchers are adding enormous talent to Baylor College of Medicine, Methodist Research Institute, Rice University, University of Texas MD Anderson Cancer Center, University of Texas - Austin, San Antonio and Southwestern Medical Center.

Houston is the Medical Capitol of the world and MD Anderson is the leading cancer treatment center. A few years ago an oncologist at MD Anderson explained to me that a doctor friend in Boston told him that Glycomics was the future of medicine. MD Anderson's President Dr. Ronald DePinho calls the voter approved cancer program one of the factors that convinced him to leave Boston and come to Houston.

According to the NIH/NCI study, glycoproteins are good for diagnosing, monitoring, proving, reproofing, testing, and researching to develop billions of dollars in drug sales. Perhaps in another ten to twenty years, we will have a cancer cure.

Measuring the quality and quantity of glycoproteins on the cell surface is an excellent diagnostic approach because the lower the glycoprotein count, the greater the cancer risk. Healthy cells are sugar coated with glycoproteins while cancer cells are bald. The misfolding of proteins is the cause for poor quality and quantity of glycoproteins. Learning how to help the cells properly fold proteins is the future of medicine and healthcare.

Yes, glycoprotein technology IS the bull's eye but perhaps the target is placed over the wrong objective. The traditional medical target is still over symptoms using drug treatments, surgeries, or radiation. In the process, many are helped, but we can do so much more if we simply move the target from symptom to cause.

Over the last couple of decades, universities around the world have generated conclusive data that animals and humans that consume Smart Sugars have phenomenal health benefits with the immune system, brain function, and, directly or indirectly, virtually all diseases. Can we slash a trillion dollars out of healthcare cost by just eating these sugars? I think we can.

For a fraction of the billions invested in cancer research, we may be able to verify through Pilot Surveys and Clinical Studies what can be accomplished in humans with Smart Sugars, balanced body pH, and supplementation of natural vitamins and minerals. Without fanfare or news, one sugar, mannose, eradicated cancer in the American poultry industry. That story is documented in my Glycomics-textbook, **Expand Your MIND - Improve Your BRAIN.**

The National Cancer Institute now verifies what I have been teaching for nearly two decades: The cause for cancer may be low quality and quantity of glycoproteins on the surface of cells. I applaud the NCI for their ability to determine this fact and to use Glycoscience as the ultimate focus for future diagnostics. The same Glycoscience diagnostics used to count these receptor sites should encourage us to grow more glycoprotein receptor sites through proper care and feeding of the cell.

Chapter Three

Glycoscience Meets Quantum Physics

This chapter is dedicated to the scientists at heart. My wife is not one of them. She thinks you will probably want to skip over this chapter that made her brain hurt.

Quantum science was a hard pill for Albert Einstein to swallow because of its mind bending, paradoxical explanation of phenomena. Today, a little bit of sugar will... that's right... make the medicine go down.

Quantum biology is an emerging scientific discipline. You never heard of Quantum Glycobiology or Quantum Glycomics (QG). This chapter is your introduction and you will see how QG will help us solve the mysteries of why some sugars are so unbelievably beneficial for improving health and may in the future even be able to correct otherwise impossible devastating illnesses.

Scientists are grasping at quantum's bizarre properties to solve mysteries of the evident influence of unseen forces. We will learn how to harness quantum influences, but first we need to understand how the same wave-particle properties can produce drastically different outcomes.

In QG, we will be required to understand how the folding of different proteins and sugars are entangled with unknown forces including ions, magnetism, photons, radiation, and thought, and manipulated further with variant thermal conditions, light of various spectrum, rate of radioactive decay, direction of rotation, speed of spin, angles, gravity, and electrical discharge transfer of energy. Perhaps anything is possible with quantum mechanics.

I could hear you whisper, "*How can thought be involved in quantum glycobiology?*" Think. In clinical studies, the placebo effect works in about a third of the patients who are taking a sugar pill, a "bad sugar" pill yet. Animals don't exhibit the placebo effect.

It was the variant factors of entanglement that baffled Einstein and caused him to call quantum physics, "*spooky action at a distance.*" The real relativity factor of future science is the understanding of entanglement. The reason the entanglement factor is so important is the fact that it often works at the tipping point level of efficacy. The tipping point factor can be explained with a perfectly balanced scale holding in each bucket half the water of all the oceans. The tipping point for the scale to tilt either direction is to add one drop of water to your choice of either side. This is how relative a drop of H²O is when it puts its weight behind a purpose. In quantum physics, the possibilities are endless, beyond just one tilting to the left or right like the drop of water on the scale. The endless possibilities of mysterious influences can alter the state and

performance of a molecule or a system. The effect, the behavior, the consequences, are as pervasive as they are profound.

Quantum influences are relative to all systems regardless of size. Quantum physicists have been concerned primarily with microscopic anomalies. There may be no boundaries of quantum prediction because of the incoherence of unknown factors. It is this entanglement that binds all the particles together to produce unknown quantities for strange conclusions. Here collective properties become virtually impossible to untangle.

Like the tilting scale, when propensity is altered, that newly directed influence may gather momentum and influence compounding change. I postulate that the peer pressure of particle momentum influences atoms, ions, photons, magnetism, and thought. We have in a previous lesson discussed how a thought triggers a constellation of synapses in your brain to take flight like a flock of birds. Scientists have learned that elementary particles also react like waves of activity and develop a propensity to operate in unison. This is the law of attraction manifest.

In other writings, I will discuss how it is the very entanglement that produces the outcome. It is mangled entanglement that produces chaos. It is the proper folding of proteins that gives order to the human body and the misfolding of these same proteins that causes neurodegenerative diseases. Quantum glycobiology resides in the entanglement of proteins and sugars forming glycolipids and glycoproteins that are the Operating System (OS) of the human body.

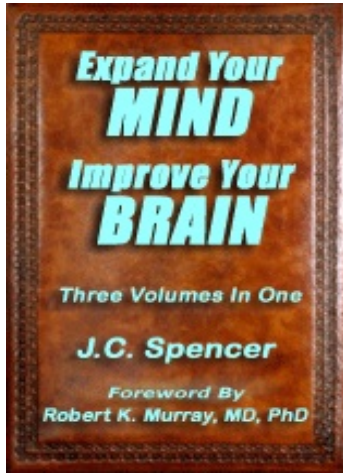
Vlatko Vedral of Oxford admits, *“Implications of macro-scopic objects such as us being in quantum limbo is mind blowing enough that we physicists are still in an entangled state of confusion and wonderment.”*

It appears no one understands quantum physics but that has not kept brilliant minds from enjoying the possibilities nor kept them from babbling utter nonsense about things that are not relative. Quantum physics extends new opposing challenges to the theory of relativity. And, QG opens the door for understanding the benefits of sugars like never before.

Additional reading and training materials

Online sales support continuing Glycomics education and research.

Direct to Bookstore <http://www.endowmentmed.org/EndowmentBookStore.html>

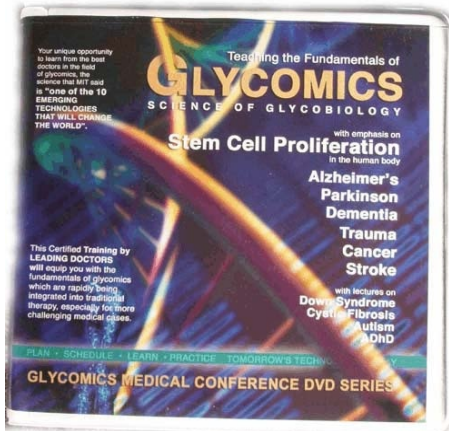


Expand Your MIND - Improve Your BRAIN is an easy to read entertaining science textbook. Over 700 MDs, PhDs, Scientists, Researchers and Educators are referenced in the field of Glycomics and Brain Function. 512 page Textbook.

Available as an e-textbook, perfect bound 8 1/5 x 11, and hardbound editions

Three Volumes in One e-textbook	\$ 47.77
Softbound	\$ 77.77
Hardbound	\$127.77
Vol. 1; Vol. 2; and Vol. 3 individually	\$ 27.77 ea

Available in the Book Store at www.endowmentmed.org



14 hours Professional Glycomics DVD Training Series from First Glycomics Conference for Healthcare Professionals includes 500 page syllabus (SAVE \$100 off regular price of \$299) \$199 (Testing available)

14 hours General Public Glycomics DVD Training Series from First Glycomics Conference for the General Public (does not include 500 page syllabus (SAVE \$100 off regular price of \$199) \$99



Stem Cell Survey - A Technical Syllabus on CD by H. Reg McDaniel, MD provided for use by Healthcare Professionals. Evidence that Glycomics can increase stem cell proliferation and stem cell function in humans. Learning and Behavior Problems in Children Responsive to Micronutrients Led to Benefits Reported in Infants and Youth and Maternal Alcohol Damage (FAS). Your contribution of \$50 serves as a fundraiser and is shared between The Endowment for Medical Research and the Fisher Institute for Medical Research.

Medical Professionals and the general public are welcome to learn more about Glycoscience from these free educational websites.

www.GlycoscienceNEWS.com

or

www.GlycoNEWS.com

www.EndowmentMed.org

www.DiabeticHope.com

Sponsored by

The Endowment for Medical Research Inc., a 501(c)(3) non-profit faith based scientific research, educational, Public Charity.

P. O. Box 73089 - Houston, Texas 77273

www.glycoscienceNEWS.com

or

www.glycoNEWS.com

Glossary

Glyco	Greek for sugar.
Glycoscience	Science of sugars.
Glycomics	Science of sugars.
Glycobiology	Biology of saccharides, sugar chains, and glycans.
Glycosylation	Process in which a sugar is attached to another molecule, as attached to a protein to become a glycoprotein or glycolipid.
Glycan	Sugar structures assembled one sugar at a time as building blocks to be linked and bonded usually to a protein.
Sugar	A carbohydrate of carbon, hydrogen and oxygen. It is estimated that there are 200 various types of sugars found in nature.
Carbohydrate	Organic compound that includes sugars, starches, and celluloses, produced by photosynthetic plants and contain only carbon, hydrogen, and oxygen.
Saccharide	Simple sugar molecule.
Monosaccharide	A carbohydrate that does not hydrolyze (maintains molecular structure), as glucose, fructose, or ribose.
Disaccharide	Two monosaccharides bonded together as in maltose, lactose, sucrose (invert sugar with alkaline stability), and trehalose. Each has unique function determined by the bond.
Oligosaccharide	A carbohydrate made up of a few linked monosaccharides.
Polysaccharide	A complex carbohydrate composed of sugar molecules linked into a branched or chain structure.
Homopolysaccharides	Polysaccharides formed from only one type of monosaccharide subdivided into straight-chain and/or branched-chains.
Heteropolysaccharides	Polysaccharides formed from two or more different types of monosaccharides in straight-chain and/or branched-chains.
Glyconutrient	A food or supplement containing bioactive and functional sugars.
Phytonutrient	Phyto is Greek for plant. Bioactive plant nutrient. Functional sugars are phytonutrients but all phytonutrients are not sugars.
Phytochemical	Plant chemicals. Functional sugars are phytochemicals but all phytochemicals are not sugars.
Glycoproteins	Receptor sites made from specific sugars and proteins that reside on the surface of all healthy cells like fuzz on a peach or trees on the surface of the earth. It is these complex sugar chains that determine precise communication functions.
Glycolipids	Receptors are made from specific sugars and fats or fat-like substances. These communication devices inside the cell control critical cellular function.

This page is intentionally left blank.

The subject of this book is now proven to be the bull's eye, the Rosetta Stone, the Holy Grail, of medicine and of all healthcare. Everything points to accelerated and expanded glycoprotein research, and rightfully so.

The author condenses the knowledge of Glycoscience he has gained during the last two decades into three brief sections for the layperson to better understand and for seasoned medical scientists, professors, and researchers to gain new information to better comprehend the depth and importance of this emerging discipline of science.

- Chapter One **What are Smart Sugars?**
- Chapter Two **Glycomics Holds the Answer to Cancer
for Prevention, Diagnosis, and Treatment**
- Chapter Three **Glycoscience Meets Quantum Physics**

Profits from the sale of this book are used for continuing education and research of Glycomics.

\$29.97