Sugars that Aid Protein Folding ¤ Significant New Discovery in Glycobiology

Lesson #14

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Misfolded protein can play havoc with your DNA. Biologists have recently discovered that unstructured proteins are more prevalent than previously thought and that over one third of the proteins in the body are intrinsically disordered with unfolded, partly folded, or chaotically folded proteins.

Flexible proteins in your cells are designed to fold around many possible partners. The perfect marriage partner is specific sugars that make glycoproteins and glycoliped, the operating system (OS) for all cellular communication.

I wrote an article a few years ago referencing research that indicates Dementia, Alzheimer's, Parkinson's, Huntington's, Autism, ADD, ADHD, and other neurodegenerative diseases are caused by misfolded (mutated) toxic proteins. (See link at end of lesson.)

Structured proteins have vital performance plans for the cell. However, the level of performance for a desired PURPOSE cannot be higher than the weakest link of the parts. FUNCTION is always based upon the DESIGN and how well that blueprint is followed in making and assembling the parts.

The DNA contains the blueprint for properly folding each protein of your body. Corrupted gene expression causes protein misfolding which weakens the immune system and brings chaos to hormonal regulation. The slightest misfolding generates chaos in the system and the cell's cry out for correction. In this desperate call, many mixtures of proteins can be produced from amino acids. The design for a specific function calls for the chain of amino acids to fold into a very precise configuration.

Back in 1931 Chinese biochemist Hsien Wu showed that protein denaturation caused complete loss of function. Many, what I call, "floating proteins" may have no contributing benefit while others await their final folding purpose. Their ability to morph and bind to other molecules may be beneficial or can develop into ultimate chaos.

Plentiful healthy parts make for the perfect match of keys and locks that literally turn off and on the gene expressions to accomplish their desired objective at that moment.

A corrupted gene expression starts and perpetuates chaos by transcribing faulty data. The repository of genetic information may be corrupted in editing, splicing chromosomes, or caused by sequencing becoming out of sync. The transcribing of chromosomes with out of sync OFF and ON sequences may be miraculously corrected after the fact. A switch stuck in the inactive position can be turned on. Under proper conditions it can become unstuck and corrected. Drug companies are seeking drugs to turn on and off switches to fix certain diseases. This method will most likely compound the problem by turning OFF and ON other switches they are not considering.

Many of the yet unfolded proteins are folded only as needed, may be used in ways we do not yet understand, or used for great damage like transcribing DNA fragments. A virus is a very corrupt misfolded protein that inhibits a cell from dividing. The virus is a self-centered egotistically protein stuck on itself, wrapped in self indulgence, folded around itself. Unable to reproduce itself, it corrupts the "partner" cell with instructions to "duplicate me instead of yourself".

Studies have revealed that sugars can regulate the folding process when a newly minted protein interacts with so-called chaperone molecules. The sugars "*actually help a protein to fold*," says Raymond Dwek, director of the Oxford University Glycobiology Institute. "*That is one of the most significant discoveries in glycobiology*."

Students, doctors, scientists, professors and laypersons, connect the dots in these related articles and we will better understand why MIT said, Glycomics is one of the emerging technologies that will change the world.

Glycomics is the future of medical science and healthcare. Facts in this Lesson help us understand why proteomics, genomics, and glycomics are in their early years of research and theoretical studies. The term GLYCOBIOLOGY was coined at Oxford University in 1988. Normal time for acceptance of a breakthrough disruptive technology or discovery is forty tears. Are we half way there yet?

The genetic code contains all the rules for cell development, maintenance, and division. Toxins in our air, water, and food negatively alter gene expression. Good nutrition and especially royal sugars improve gene expression. Many physicians and other healthcare practitioners have received continuing education in glycomics through the 14 hours Glycomics DVD Training Series produced by The Endowment for Medical Research.

Additional source: Scientific American April 2011