

Last month I threw out the idea that the way we think about disease is stuck in a one-disease one-cure paradigm. Since we are moving quickly into genomic medicine I think it would help all of us to rid ourselves of that notion.

All life on this planet is based on cells. If you were able to observe yourself developing from the single cell that started you on your journey you would quickly come to realize that you are trillions of cells forged into a whole functioning interdependently. Interdependence, whether in a human society or a cellular society, is all about cooperation and control; cooperation and control requires a language.

To understand that language we need to understand the relationship between DNA, genes, proteins and disease. The language of all cellular societies is based, not on words, but on chemistry. Using molecules where we use words, our cells construct sentences from chains of proteins that inform, command, and instruct each other. Our cells use the information found in our genome to construct those proteins. Genes conserve the language but cells can use it to converse. The breakdown in cellular communication, whether inherited or acquired, results in disease. 21st Century medicine is based on understanding this communication breakdown.

When all your genes, your genome, are in sync you are free of chronic disease. Over time factors that may or may not be under your control alter the dialogue among hundreds of genes. Some "over express", talk too loudly, others "under express", talk too softly, some shut down and don't talk at all and others talk when they should be quiet. It doesn't take a rocket scientist to realize that when communication breaks down the end result is something less than perfect, in this case a disease.

And guess what, it's environment and lifestyle that are the cause of most of this gene expression imbalance. Understanding gene environment interactions is particularly important because the chronic diseases that face us today are recent developments, occurring over only a few generations. These diseases are complex and multifactorial, that is, they are caused by a complex interplay of multiple genes and environmental factors. These factors are in the physical environment as well as in the behavioral and social environments. Genomes can't change over such a short period of time but our environments have, leading to adverse effects on individuals who are genetically predisposed to respond poorly to these new challenges. AND THAT APPEARS TO BE THE VAST MAJORITY OF US

Sustainable medicine for the 21st Century is about personal and societal accountability. One of the growing challenges facing our healthcare system is managing the care for the growing number of people with chronic diseases. Promoting healthy lifestyles and a cleaner environment to prevent chronic illnesses and working aggressively to help patients with chronic illnesses manage their own health is one of the greatest challenges facing our nation.