

Desert: A Metaphor from the Study of Genetics

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In most of the human lives I know about, there are stretches of time which feel stagnant, or worse. We can feel adrift, or wounded and sidelined, and these times don't seem to carry much usefulness while they are unfolding. These same passages through difficult days often wind up being pivotal in some way for our development, although it is only retrospection that allows us to appreciate that a depression or heartache has influenced the more engaged and lively periods afterward.

How many of us can trace some impulse of compassion to a remembered time when we were suffering? How many of us needed some event to slow us down so we could hear something important from within our own hearts? Recently, I've been thinking about how many times I've undervalued an experience, or idea, or piece of advice along the way. The musing was triggered by a seminar I attended recently which included a presentation on breast cancer genetics. During the talk, I noticed that something has changed in the terminology used by geneticists in recent years.

DNA is often referred to as the instruction book for how to make an organism. It contains the codes for how to assemble proteins, information which is held in genes. There are also long stretches of DNA that do not code for protein. As these sections did not do the job that had been established for DNA, such regions were referred to as "junk DNA" for many years. It slowly began to emerge that these regions did perform functions, often having to do with providing a physical scaffold on which to assemble machinery to copy the DNA instructions.

Over time, DNA that did not contain genes became known as, "non-coding DNA." This is an improvement over "junk DNA," although it still defines the region by something it is not. As research progresses, more information and significance accrues to these areas. It turns out that important regulatory functions reside in non-coding DNA, with real consequences for health. Even genes which are coded perfectly will fail us if the regulation of their expression is faulty, and such vulnerability would be found in DNA which surrounds a gene rather than in the gene itself.

Most recently and rather evocatively, I've begun to see the term "gene deserts" applied to particularly extensive stretches of non-coding DNA. While still defining the areas by their lack of genes, the "desert" term appeals to my imagination. Long stretches without obvious meaning which nonetheless shape the outcome of the whole ... this image brings back memories of times in my life which have felt meaningless and turned out to be vital, even foundational. The term "desert" captures that sense of wilderness, of not knowing how to find one's bearings but sensing that there is something there to know, something that does not give up its secret meaning immediately.

The shift in the language of genetics made me smile. It is so predictably, fallibly human to discount the value of anything we don't have a name for, a schematic for. Again, my training in acupuncture prior to molecular biology came to rescue my perspective as this basic error is not as built into holistic thinking. In acupuncture, we look at meridians, which have long stretches unpopulated by the named points that we memorize and work with. Yet, there is no tradition of calling the space between Large Intestine 11 and Large Intestine 10 "junk meridian."

Someday, there will probably be no place for the term "junk DNA" in biology. In the last year, research from a genetics group in London demonstrated that gene desert DNA physically influenced genes residing millions of base pairs away. The contorting of a DNA strand to make these connections is perhaps counterintuitive, but a reminder that even those parts of ourselves that we believe to be linear are actually much more complex and more interconnected than that. Even if two pieces with functional linkage are separated by apparently meaningless material, they may actually require enough separation that one piece can make the curve, double back, and connect to the other at just the right times. It's built into this model that even if the significance of non-coding DNA is fully described, some of it may exist to facilitate the function of other sections, the flashier parts which seem at first glance to be where the meaning resides. But in DNA, as in life, there is meaning to be everywhere. The holistic approach to health and disease does not find this surprising.

Reference:

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JULY 2015