

The Language of DNA

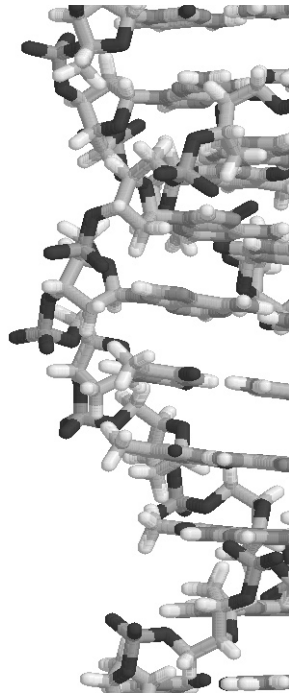
by

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DNA is the stuff of inheritance, the most important substance passed from parent to child. It is a long, stringy molecule made of four different chemical “bases,” adenine, cytosine, guanine, and thymine. These bases are used to spell out many different sequences, some of which might be genes that specify visible attributes. For example, there are genes for eye color, hair color, height, the shape of your ear lobes and nose, and there’s even a gene for the ability to roll your tongue (not everyone can do that)!

The entire DNA content of one of your cells is called the genome. The human genome contains three billion DNA bases, which means if we saved this on a computer, it would require at least 3 gigabytes of disk space! Our genome bases spell about 25,000 different genes. Animals and plants have their own genomes, which are usually very different from the human genome.

Most of the bases found in human, plant, and animal genomes spell out repetitive sequences that might be repeated thousands of times, over and over again, mixed in with the occasional gene. Some repetitive sequences have their own genes that allow that repetitive sequence to move around in the genome on their own. These repetitive sequences



are called transposable elements. In the human genome, the most repetitive sequence is a transposable element called *Alu*, and it occurs slightly more than a million times.

Many scientists think this repetition is just wasted space. They think repetitive DNA is junk that has built up over the eons of evolution. It serves no useful purpose in the genome, and it might even be a detriment, but one that all plants and animals seem to share. A few other scientists think this repetitive DNA might have been important for the evolution of new characteristics.

As you might already know, creationists have long held that DNA has the properties of a language. They point to the four different bases, which are like letters, that spell out genes, which are like words. The genes then code for traits, much like the words on this page are linked to mental ideas in your mind as you read. Many creationists think

that this is more than just a convenient analogy for explaining how DNA works. They think the linguistic coding in the DNA is really a language and therefore requires an intelligent designer to speak it.

That sounds like a reasonable argument, but what about the repetitive sequences? If the genes that code for characteristics like eye color are the language of DNA, then what is all that extra DNA for? Evolutionary scientists think that repetitive DNA isn't "for" anything, because in many cases, repetitive DNA can be lost or removed and you might never notice a difference in the organism. In fact, the three billion bases of the human genome is just an average. There are normal, healthy people waking around today that have a little more or a little less than three billion bases, because some of this repetitive DNA has been deleted. If repetitive DNA was important to our genomes, why can it be lost?

One way to think about repetitive elements is to carry on with the idea of DNA as language. In our language, do we ever use repetitive elements? Now, your first thought is that you try not to repeat yourself, even though most of us do end up repeating ourselves, sometimes often. But let's think about the words that we use and how repetitive they are. Some words get re-used again and again because they are useful. Words like *the*, *and*, *of*, and *I* are very useful words that help us to communicate. What if we took a piece of literature and analyzed it in the same way that genome scientists analyzed the genome? What would we find?

Let's take the King James Version of the book of Genesis. Genesis consists of 38,264 words, but only 2,447 unique words. That means the

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average word is used 15.6 times! The most used word is *and*, which appears 3,678 times, followed by *the* (2,458 times), *of* (1,365 times), *his* (653 times), and *he* (652 times). The top most-used words account for 11,620 of the words in Genesis, which is almost a third of the book. Those numbers make Genesis sound like it's just repeating itself over and over again!

But we know that Genesis doesn't just repeat itself. Those words must be read in the order in which they were written, and when you do that, Genesis tells a clear story that starts with the creation of the world and ends with the death of Joseph in Egypt. If we only concentrated on the repetitive words, we might miss out on the more unusual words that help to make Genesis sensible. For example, *God* appears 233 times, *Israel* 42 times, *covenant* 26 times. These rarer words work with the highly repetitive words to tell the story of Genesis. But if we couldn't read English, we might only be able to tabulate words, and we might conclude that *the* or *in* are just so much repetitive

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junk.

Let's apply this line of thinking back to the language of DNA. When we examine the repetition of some DNA sequences in the human genome, we find many thousands of copies, but if DNA really is a language, shouldn't we expect some repetition? Considering what we found in the "sequence" of the words in Genesis, shouldn't we expect that certain sequences will show up again and again, much like *and*, *the*, *of*, and *his*? What if these repetitive sequences are not junk at all? What if they are a necessary part of the genome that makes sense of the genes?

If it's true that these repetitive sequences are important then why is it possible to remove some of them and still have healthy, normal individuals? Just because something is important doesn't mean it is essential. Take Genesis 3:6 for example: "And when the woman saw that the tree was good for food, and that it was pleasant to the eyes, and a tree to be desired to make one wise, she took of the fruit thereof, and did eat, and gave also unto her husband with her; and he did eat." If we removed all copies of the word *and* from that verse, it would read "When the woman saw that the tree was good for food, that it was pleasant to the eyes, a tree to be desired to make one wise, she took of the fruit thereof, did eat, gave also unto her husband with her; he did eat." That sounds a bit

stilted, but we can still make sense of what is being described. So too with repetitive sequences that are removed from a genome. Their loss might be completely imperceptible to the individual because any one repetitive element is not by itself essential.

If this idea is correct, then the repetitive DNA in our cells isn't junk at all. It's important, in the broadest sense, to creating the context in which the genes make sense. Bits and pieces can be lost or changed without much effect, but larger changes should change the individual. When we look into the field of comparative genomics, which deals with the similarities and differences between two different genomes, we find that species often differ the most in their repetitive sequences. For example, various species of rice differ in their transposable element content.

Creationists in the past have tried to explain “junk” DNA by pointing to functions of specific repetitive sequences, but with millions of sequences present in the genome, a broader approach to the problem would seem to be more effective. Thinking about DNA as a real language provides just such a broad approach to developing a creationist understanding of genome sequences. By seeing our DNA, like everything else in creation, as a revelation of the Creator (Ps. 19:1; Rom. 1), we can make sense of things that at first seem strange and useless. And by placing God at the forefront of our science, God receives the glory of our work.

For further reading:

Wood TC. 2003. Perspectives on AGEing, a young-earth creation diversification model. In Ivey RL, ed. *Proceedings of the Fifth International Conference on Creationism*. Creation Science Fellowship, Pittsburgh, pp. 479-489.

Wood TC. 2006. The chimpanzee genome and the problem of biological similarity. *Occasional Papers of the BSG* 7:1-18. Available online at <http://www.bryancore.org/bsg/opbsg/007.html>.

