TMR Trends in Medical Research

OPEN ACCESS

News & Comments

Were Our Grandparents a Result of Gonorrhea?

Gajendra Sharma

Older adults are protected from cognitive decline by a set of genetic mutations. Homo sapiens may have evolved this genetic variance under selective pressure from infectious pathogens like gonorrhea, according to a new study.

Scientists discovered a set of genes that protect older adults against cognitive decline and dementia. An attempt is made in this study to trace the evolution of one of these mutated genes, specifically when and why it appeared in the human genome. Our immune system differs from other primates in that we have a unique type of immune receptor that protects us from Alzheimer's disease. Their findings suggest that this variant immune receptor did not spread randomly but was the result of a relatively short period of intense selection pressure.

According to research, Neanderthals and Denisovans lacked this version of immune receptors encoded in their genomes. A special immune receptor developed early in the history of humans.

Neisseria gonorrhoeae is an infectious human-specific pathogen that disguises itself by dressing in a sugar coating similar to human cells, fooling immune cells into thinking the bacteria are harmless.

In order to trick the human immune system, Gonorrhea learned how to act like any other cell of a person. Despite this, the human immune system managed to defend itself. Unlike the older variation of the immune receptor, the newly evolved receptor was able to see through the disguise and kill the invading bacteria.

The new immunoreceptor is called huCD33. Due to the subtle differences in its structure within our bodies, this version has been studied by evolutionary scientists for some time. Microglia, which are brain immune cells, probably co-operated with this immune receptor, once evolved, for a different purpose: protection against aging.

Alzheimer's disease is associated with amyloid plaques and damaged brain cells that are cleared by microglia that express the huCD33 receptor. There is some debate as to whether this has contributed to evolution's ability to add a few more valuable years to our lives for the sake of helping raise families.

KEYWORDS

CD33, pathogen, sialic acids, archaic genome, molecular dynamics simulation, phylogenetic analysis, bacteria, brain research, evolution, evolutionary neuroscience, genetics, gonorrhea, neurobiology, neuroscience, ucsd