EVOLUTION AND DISEASES. A TRADE OFF

This concept has been illustrated several times in earlier posts. This is another example.

The *apolipoprotein-ε4 (APOE-ε4)* allele increases the risk for several chronic diseases. In this case and similar cases the obvious question is: why were these variants not wiped out during evolution?

The authors (Trumble et al., Science Advances, 2023[1]) investigated a "wild" population (Tsimane, Bolivia). In this population, they discovered that women carrying at least one APOE-ε4 allele tended to have 0.3 to 0.5 additional children compared to individuals with the (ε3/ε3) homozygous genotype. Moreover, those with two APOE-ε4 alleles exhibited an even more substantial increase, with 1.4 to 2.1 more children on average. The enhanced fertility among APOE-ε4 carriers was attributed to their tendency to commence reproduction 0.8 years earlier and have a 0.23-year shorter interbirth interval.

They concluded that "alleles that are deleterious in sedentary urban environments may have been maintained by selection throughout human evolutionary history" (because they were connected to a higher fitness).

1- https://www.science.org/doi/full/10.1126/sciadv.ade9797?rfr_dat=cr_pub++0pubmed&url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org