

GENETIC ADAPTATIONS TO INFECTIOUS DISEASES IN AFRICA

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Infectious diseases have played a critical role in the evolution of modern humans, particularly in sub-Saharan Africa where pathogens have been, and still are, a major cause of human mortality. This is especially true for pathogens sharing a long-standing relationship with *Homo sapiens*, such as those that cause malaria, smallpox, cholera, tuberculosis and leprosy. The genetic adaptation processes leading to the development of pathogen resistance, by increasing the frequency of protective alleles, have widely differed between populations depending on their evolutionary history, lifestyle, environment and local exposure to pathogens. These population-specific adaptive responses have resulted in a differential susceptibility to infections among present-day populations in Africa. This has also led to an increase in the prevalence of many non-communicable diseases that are now major sources of morbidity and mortality in this continent and are expected to overtake infectious diseases in the next decades.

This talk will review the best-known case studies that illustrate how pathogen-driven selection has shaped the patterns of genetic and epigenetic variability in contemporary Africans. If candidate-gene approaches have provided the most convincing evidence for the action of natural selection on particular genes involved in immunity and host defense, we will also show how the technological revolution in genomics, with the advent of both genome-wide and deep-sequencing approaches, has stimulated new ways to examine human adaptation to infectious diseases. Finally, we will discuss how the present-day incidence of some chronic inflammatory and autoimmune diseases in Africans and people of recent African ancestry may represent a by-product of past adaptation to infections.