

Biologists discover why 10percent of Europeans are safe from HIV infection

10 March 2005

Biologists at the University of Liverpool have discovered how the plagues of the Middle Ages have made around 10% of Europeans resistant to HIV.

Scientists have known for some time that these individuals carry a genetic mutation (known as CCR5-delta 32) that prevents the virus from entering the cells of the immune system but have been unable to account for the high levels of the gene in Scandinavia and relatively low levels in areas bordering the Mediterranean.

They have also been puzzled by the fact that HIV emerged only recently and could not have played a role in raising the frequency of the mutation to the high levels found in some Europeans today.

Professor Christopher Duncan and Dr Susan Scott from the University's School of Biological Sciences, whose research is published in the March edition of *Journal of Medical Genetics*, attribute the frequency of the CCR5-delta 32 mutation to its protection from another deadly viral disease, acting over a sustained period in bygone historic times.

Some scientists have suggested this disease could have been smallpox or even bubonic plague but bubonic plague is a bacterial disease rather than a virus and is not blocked by the CCR5-delta 32 mutation.

Professor Duncan commented: "The fact that the CCR5-delta 32 mutation is restricted to Europe suggests that the plagues of the Middle Ages played a big part in raising the frequency of the mutation. These plagues were also confined to Europe, persisted for more than 300 years and had a 100% case mortality."

Around 1900, historians spread the idea that the plagues of Europe were not a directly infectious disease but were outbreaks of bubonic plague,

overturning an accepted belief that had stood for 550 years. Professor Duncan and Dr Scott illustrated in their book, *Return of the Black Death* (2004, Wiley), that this idea was incorrect and the plagues of Europe (1347-1660) were in fact a continuing series of epidemics of a lethal, viral, haemorrhagic fever that used the CCR5 as an entry port into the immune system.

Using computer modeling, they demonstrated how this disease provided the selection pressure that forced up the frequency of the mutation from 1 in 20,000 at the time of the Black Death to values today of 1 in 10.

Lethal, viral haemorrhagic fevers were recorded in the Nile valley from 1500 BC and were followed by the plagues of Mesopotamia (700-450BC), the plague of Athens (430BC), the plague of Justinian (AD541-700) and the plagues of the early Islamic empire (AD627-744). These continuing epidemics slowly raised the frequency from the original single mutation to about 1 in 20,000 in the 14th century simply by conferring protection from an otherwise certain death.

Professor Duncan added: "Haemorrhagic plague did not disappear after the Great Plague of London in 1665-66 but continued in Sweden, Copenhagen, Russia, Poland and Hungary until 1800. This maintenance of haemorrhagic plague provided continuing selection pressure on the CCR5-delta 32 mutation and explains why it occurs today at its highest frequency in Scandinavia and Russia."

Source: University of Liverpool

APA citation: Biologists discover why 10percent of Europeans are safe from HIV infection (2005, March 10) retrieved 16 June 2021 from <https://medicalxpress.com/news/2005-03-biologists-10percent-europeans-safe-hiv.html>

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