# Sibley and Ahlquist Biography

## Sibley and Ahlquist

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# Biography

Charles Sibley, a Yale University professor of biology, and his colleague Jon Ahlquist developed a process for comparing deoxyribonucleic acid (DNA) between species. Not only did the procedure reveal the genetic similarity of two species, but it acted as a timeclock of evolutionary change. Applying the technique to primate evolutionary relationships, Sibley and Ahlquist showed that human and chimpanzee DNA are 99% identical and, therefore, that chimpanzees are the closest living relative to humans. They also proposed a relatively recent split for humans, chimpanzees and gorillas, possibly as recent as five million years ago.

Until the latter half of the twentieth century, anthropologists had relied on the fossil record to support their theories. The relative scarcity of fossils, the fragmentary nature of the fossil record and the limitations of using physical features to reconstruct human prehistory were obstacles faced by biochemists who began experimenting with the comparison of genetic material among living species.

Expanding on the work of earlier scientists who had experimented with using blood chemistry to determine genetic relatedness, Sibley and Ahlquist looked at the entire genetic makeup of a species. The double helix structure of DNA is held together by chemical bonds created through the attraction of its chemical subunits called nucleotides. Sibley and Ahlquist separated the DNA strands by heating them and mixing the DNA of two species. The attraction between the two and the closeness of the match, was measured by again separating the strands. The heat required to break the chemical bonds measured how well they matched--a one percent reduction in temperature indicated a 99% match of nucleotides. The evolutionary clock was calibrated by comparing the DNA in species where a good fossil record of ancestral origins existed to known living descendants whose DNA could be analyzed. A mutation rate of one per cent every five million years was observed.

Because the analysis of DNA conflicted with the current interpretation of the fossil record, the anthropological community initially rejected Sibley's and Ahlquist's results. However, a 1979 fossil discovery which proved Ramapithecines ancestral to orangutans rather than humans reconciled the conflicting views.