

# Allan's 'Molecular Clock' Tracked The Human Pathway

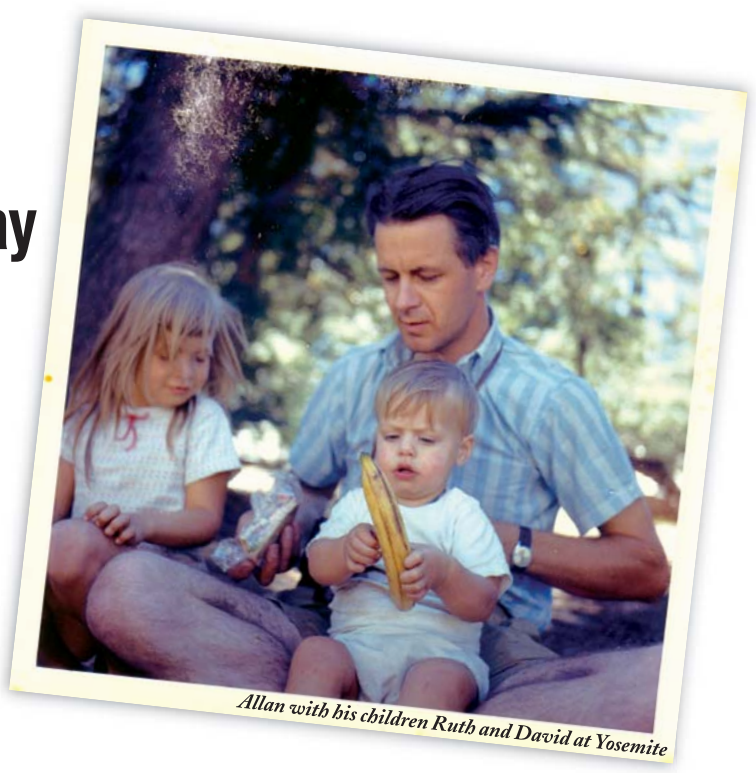
Through studying birds to find out how they had evolved over millions of years, with mutations in their genes encoded in the proteins of their DNA, Allan Wilson realized he could read the proteins in the tissue of diverging species as historical documents – a 'molecular clock.' The greater differences that had accumulated as they diverged, the longer they had been separated from their original genome. This relationship between time and genetic change cast a whole new light on evolution, inspiring a new generation of scientists to build on Allan's discoveries.

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Study began afresh on chimps and gorillas but when Allan started talking about human evolution, it became very controversial. Science had known since Darwin that chimps and humans shared a common ancestor. It was thought that man derived from Ramapithecus (suggested to be a human) 15 million years ago, with a common ancestor 30 million years ago. Using the 'molecular clock' reasoning (bigger differences equate to greater time since their last common ancestor), Allan and his colleague Vince Sarich deduced that the earliest proto-hominids (humans) branched from chimpanzees only five million years ago. Genetic re-analysis of the original data showed that European Neanderthal and Java Erectus were also not ancestral to modern humans.

***Allan Wilson gave science new ways to understand how humans evolved and he changed how we study the evolution of all creatures. His work provided a foundation in molecular biology that would affect all the sciences and shake up our previous understanding of human evolution.***

There was a furor over the discovery, which reversed decades of belief about the relationship of primates and the involvement of humans, based on fossil evidence. The pair's reply to critics was: "we know our molecules had ancestors, but we don't know that



*Allan with his children Ruth and David at Yosemite*

your fossils had descendents." Paleontologists asked "if humans and chimps are the same in 99% of structural genes, why are we so different?" The answer? "The critical difference is not in the protein difference in the genes, but in the timing of those genes and the ways in which they are regulated."

Similar research on birds, fish and lizards had resulted in similar outcomes, with no argument. But established science questioned the findings when they related to humans. Despite molecular evidence being as strong as the conventional fossil evidence, Allan remained on the fringes of the anthropological community for the next twenty years. He thrived on the opposition, attracting in some of the brightest minds of the time - his enthusiasm and open mindedness were inspirational. A whole new type of science was born as systematics, microbiologists and biochemists came to Berkeley to learn the techniques involved. Molecular evolution labs sprang up around the world. ■

In the early 1980s, just as the findings on the age of the proto-humans were being accepted, Allan and his colleagues were to shake the scientific world again and upset religious creationists. It was announced that intensive testing of people from all races through the Mitochondria DNA in placenta traced modern humans back to a common female ancestor in Africa – an 'Eve' who had lived around 150,000 years ago. Mitochondria DNA (mDNA) are genes that sit in the cell, but not in the nucleus, and are passed from mother to child. Again, as in the 1960s, many palaeontologists rejected these conclusions. Fossil scientists were unfamiliar with biochemistry and trusted their own data more than molecular data. The 'Out of Africa' theory is now the accepted account of modern human origins. Allan and his colleagues had transformed genetics from a study of inherited traits into a respected biochemical science and proved the origin of the species. The boy from Helvetia left behind an incomparable legacy for science and for those who seek the truth.

FOOTNOTE: Allan Wilson's story continues in the next issue of Franklin local.

*Gary, Eunice, Allan and Colleen Wilson*

