

Evolution still scientifically stable

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An international team of researchers, including Monash University biochemists, has discovered evidence at the molecular level in support of one of the key tenets of Darwin's theory of evolution.

Monash University's Professor Trevor Lithgow said the breakthrough, funded by the Australian Research Council and published recently in the prestigious journal *PNAS*, provides a blueprint for a general understanding of the evolution of the "machinery" of our cells.

"Our cells, and the cells of all organisms, are composed of molecular machines. These machines are built of component parts, each of which contributes a partial function or structural element to the machine. How such sophisticated, multi-component machines could evolve has been somewhat mysterious, and highly controversial." Professor Lithgow said.

A non-Darwinian explanation, from believers of [Intelligent Design](#), proposed these complex machines to be "irreducibly complex". In other words they are so neatly complex and complete that they couldn't have evolved but rather must have been designed by an intelligent entity.

"Our research shows that these machines although complete and complex, were a result of evolution. Simple "core" machines were established in the first eukaryotes by drawing on pre-existing proteins that had previously provided distinct, simplistic functions. They therefore stand as proof that Darwin's theory of evolution breaks down at the molecular level," Professor Lithgow said.

As a model system, the research focussed on one specific molecular machine, the TIM complex, which transports proteins into mitochondria. Mitochondria are a compartment of [human cells](#) that serve as the energy-producing 'powerhouses'. At a very early stage in evolution, mitochondria were derived from bacteria that lived within the first [eukaryotic cells](#).

"Our cells literally are chimeras of a "host" cell and these intracellular bacteria. Yet bacteria don't have TIM complexes - to understand where the TIM complex came from we simply applied scientific reasoning and looked at a modern-day bacterium akin to the organism that gave rise to mitochondria." Professor Lithgow said.

The group looked at the bacterium *Caulobacter crescentus* and found bacterial proteins related to the components of the mitochondrial TIM complex. They then showed that these bacterial proteins are not found as part of protein transport machines.

"François Jacob described evolution as a tinkerer, cobbling together proteins of one function to yield more complex machines capable of new functions." Professor Lithgow said.

"Our work describes a perfect example of Jacob's proposition, and shows that Darwin's theory of [evolution](#) beautifully explains how molecular machines came to be."

Source: Monash University ([news](#) : [web](#))

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