

## Intelligent Design

[The following article is an excerpt from "Looking for God at Berkeley" by Mark Athitakis]

In a crumbling UC Berkeley research lab, Jed Macosko is looking for God. Macosko is a molecular biology researcher who holds chemistry degrees from Cal and MIT. As a scientist, he thinks that bacteria may prove the existence of an intelligent designer. Macosko's research peers deep into E. coli, a bacterium best known for the virulent strain that has caused fast-food restaurant panics, though it's normally harmless (it's swimming in your intestines right now). It's a seductive subject for a biochemist: The inner life of E. coli—indeed, any microscopic organism, is a sophisticated dance of proteins and amino acids interlocking and working together. Many molecular biologists find it utterly dazzling that something so small yet so amazingly complex could have evolved in nature.

Macosko believes that the work going on inside those bacteria isn't just amazingly complex—it's so incredibly complex that it couldn't conceivably have formed through evolution. The only reasonable explanation, he says, is that these systems and their processes were deliberately created by an "intelligent designer." Macosko, who has co-authored a handful of published scientific papers, calls that designer God, though he says you could call it anything you're comfortable with. If you like, he says, call it space aliens. He is inspired by what he claims is growing evidence that Charles Darwin's theory of evolution—the very bedrock of biology—has collapsed on the molecular level.

Macosko is not alone in his beliefs, and the proponents of "intelligent design" theory have gradually coalesced into a bona fide movement. Intelligent design theory uses science itself to undercut evolution, and many of its adherents are scholars from leading universities like UC Berkeley. Intelligent design theory is, in fact, a whole bundle of theories and arguments. From molecular biology comes an argument that organic processes like the ones Macosko studies are too fundamentally complex for evolution to explain them. From statistics: a claim that probability theory can show whether an organism has had enough time to evolve. From philosophy: a rhetorical study suggesting that Darwinism isn't science so much as a closed-minded materialist viewpoint that needs rethinking. It means saying the holes in Darwin's theories are so enormous that God or space aliens or creatures from the fifth dimension need to be there to fill in the gaps.

What evidence could inspire Jed Macosko to buck the scientific establishment and risk his reputation? Macosko works on the UC Berkeley campus as one of a quiet hive of 10 researchers in the department of molecular and cell biology. Macosko and his colleagues are studying how genetic material—RNA, DNA, enzymes, and proteins—goes about its business. It's here that Macosko pulls out a sheet of paper and patiently tries to explain exactly why he sees God when he stares at E. coli.

DNA, the double-stranded molecule that carries genetic information and makes up chromosomes, reproduces when RNA makes copy of a DNA strand. In this way, cells make proteins that help the cell do any number of things, including reproduce, or they make proteins that are essential to the life of the organism. This process begins with an enzyme called RNA polymerase, the focus of Macosko's work. It's this enzyme that splits the DNA strands in two: a template strand and a coding strand. RNA uses that coding strand to transcribe information in the DNA to make a variety of "gene products" supporting the organism—including more RNA polymerase. A complex system of molecules is doing very specific things in very specific places at very specific times at very specific rates.

Macosko believes this system to be what he calls "irreducibly complex." Irreducible complexity, a term first coined by Lehigh University biochemist Michael J. Behe, is based on two principles. First, an irreducibly complex system must have each component working in order to function; take away one part and the whole system collapses. Second, in an irreducibly complex system, each component can't have a useful function outside of the one for which it is being used.

Behe's favorite metaphor for explaining this is a mousetrap. Take one part away from a mousetrap—its spring, hammer, catch, or platform—and it becomes useless. Logically, a mousetrap had to be created by

a human engineer. Likewise, Behe argues that certain biological systems are made of component parts that had to have been created, all at once, by an intelligent designer. Darwin's theory of evolution tries to explain the variation in species of plants and animals, but irreducible complexity argues that evolution begins to collapse in molecular biochemistry. In the case of Macosko's research, the theory of irreducible complexity says that even the slightest change in the composition of RNA polymerase and its course of action in the cell would make the whole system nonfunctional. Furthermore, the arrangement of amino acids in the system is so complex that they could not have evolved.

"This RNA polymerase has to make RNA copies that are close enough to the DNA so that information is passed along, and that it can do a useful function," Macosko says. "It has to be fast enough; there are all sorts of design constraints." The very structure of RNA polymerase exemplifies this, he says. It's a complex arrangement of six chains of different amino acids—over a thousand per chain. If you change the structure or remove even a few of the amino acids, he says, the enzyme's function collapses—and that, he argues, leaves room for the possibility of God's hand structuring the process.