One of the most significant quantum observations in the life sciences comes from Fleming and his collaborators. Their study of photosynthesis in green sulfur bacteria, published in 2007 in *Nature*, tracked the detailed chemical steps that allow plants to harness sunlight and use it to convert simple raw materials into the oxygen we breathe and the carbohydrates we eat. Specifically, the team examined the protein scaffold connecting the bacteria’s external solar collectors, called the chlorosome, to reaction centers deep inside the cells. Unlike electric power lines, which lose as much as 20 percent of energy in transmission, these bacteria transmit energy at a staggering efficiency rate of 95 percent or better.

The secret, Fleming and his colleagues found, is quantum physics.

... 

Electrons moving through a leaf or a green sulfur bacterial bloom are effectively performing a quantum “random walk”—a sort of primitive quantum computation—to seek out the optimum transmission route for the solar energy they carry. “We have shown that this quantum random-walk stuff really exists,” Fleming says. “Have we absolutely demonstrated that it improves the efficiency? Not yet. But that’s our conjecture. And a lot of people agree with it.”

... 

Stuart Hameroff, an anesthesiologist and director of the Center for Consciousness Studies at
the University of Arizona, argues that the highest function of life—consciousness—is likely a quantum phenomenon too. This is illustrated, he says, through anesthetics. The brain of a patient under anesthesia continues to operate actively, but without a conscious mind at work. What enables anesthetics such as xenon or isoflurane gas to switch off the conscious mind?

Hameroff speculates that anesthetics “interrupt a delicate quantum process” within the neurons of the brain.

He speculates that the action unfolds like this: When certain key electrons are in one “place,” call it to the “left,” part of the microtubule is squashed; when the electrons fall to the “right,” the section is elongated. But the laws of quantum mechanics allow for electrons to be both “left” and “right” at the same time, and thus for the micro tubules to be both elongated and squashed at once. Each section of the constantly shifting system has an impact on other sections, potentially via quantum entanglement, leading to a dynamic quantum-mechanical dance.

I did my best to try and preserve a few key passages of the article for you.

Basically, what it's saying is that through the process of quantum mechanics, life follows a path of least resistance, the shortest possible route, through a bloom of possibilities as reality collapses in and chooses the best one. This goes to show, in my mind that we do live in the best possible world!

Not only that, but quantum mechanics makes the seemingly impossible possible -- namely that greatest mystery of all -- consciousness. Through a similar process of quantum calculation in neuronic wiggling, Dr. Hameroff proposes that our neurochemistry is influenced in a way to optimize our circuitry. I've posted in the past about quantum mechanics. I find the topic absolutely fascinating, because of the mind-boggling weird science involved and what it implies in our world. My slim grasp of the topic informs my philosophy: we live in a macroscopic cause-and-effect world as we see it, but this is all undermined by a submicroscopic boiling chaos of potential (and optimization!)