**Intelligent Life**

In an article entitled “Modular Cognition” biologist Michael Levin and neuroscientist Rafael Yuste assert: “Intelligent decision-making doesn’t require a brain. You were capable of it before you even had one. Beginning life as a single fertilized egg, you divided and became a mass of genetically identical cells. They chattered among themselves to fashion a complex anatomical structure—your body.”

“This is intelligence in action: the ability to reach a particular goal or solve a problem by undertaking new steps in the face of changing circumstances. It’s evident not just in intelligent people and mammals and birds and cephalopods, but also cells and tissues, individual neurons and networks of neurons, viruses, ribosomes and RNA fragments, down to motor proteins and molecular networks.”

Scientists have been trained to focus on “how” nature functions and not on “why” life is so successful in solving problems. Yet, Levin and Yuste affirm: “Not only is ‘why’ always present in biological systems–it is exactly what drives the ‘how’.” Evolution is a problem-solving process involving modular cognition, rather than simply the accidental result of chance and necessity.

“When unicellular organisms joined up to make multicellular bodies, each module didn’t lose its individual competency. Rather, cells used specific proteins to merge into ever more complex networks that could implement larger objectives, possess longer memories and look further into the future. Networks of cells began to work as a society—measuring and pursuing goals defined at the level of the collective.”

“Using modules nested in a hierarchy provides a neat solution to a tough design challenge: instead of specifying and controlling every element, one at a time, nature uses neuronal ensembles as computational building blocks to perform different functions at different levels.”

All levels of our living-world are intelligent at their own level, including the trillions of bacteria and fungi in and on our bodies, and cells combine their individual intelligence in communication networks. Every choice at every level of life involves an environment and thus may be an eco-choice: a choice recognizing that life involves communicating and collaborating as well as competing.

**Might we recognize that our lives require the death of trillions of intelligent cells? In digesting our food and as our bodies replace our old cells with new cells. Might we be grateful for all these lives?**

**Might we be astounded that these intelligent cells enable our experience, insights, and compassion?**

Michael Levin and Rafael Yuste, “Modular Cognition,” *Aeon*, Mar. 8, 2022, <https://aeon.co/essays/how-evolution-hacked-its-way-to-intelligence-from-the-bottom-up>