

## EDITORS' CHOICE

### Who am "I"?

I introduce a discussion of parasitism and symbiosis in my undergraduate course by asking some poor student happening to be sitting in the first row — "Who **are** you?". She answers of course — "I am so and so." I then persist with "What do you mean by "I"?" and the student begins to give me a quizzical look, perhaps starting to realize that I am actually asking one of the most important and thoughtful questions of the human experience. We then jointly attempt to define more precisely the nature of "I" — a body with arms, legs and head that respond to one's wishes, or is it a brain in this body that has inputs from the senses and somehow has long term and short term memories, or is it the actual possibly holographic memories and thoughts themselves which represent the ultimate emerging character of complex neocortical neuronal activity. I then ask what about the bacteria in her gut, hundreds of species representing over 1 kg of biotic material, or the mites (*Demodex folliculorum*) inhabiting her eye lash follicles, or the *Toxoplasma* bradyzoites hibernating within cysts in her brain (if she has eaten *steak tartare* frequently). These organisms are certainly part of her body and some are even essential for her normal development and physiology. Are they included within the "I"? And if we delve even deeper into her cells, are the nuclei in the billion of cells or the subcellular organelles part of "I"? It gets even murkier if we remember that the mitochondrion evolved from endosymbiotic purple non-sulfur bacteria and perhaps the nucleus evolved from archaeobacteria. Does my student's "I" include these evolutionary memories? Or is the "I" her nuclear genetic information which in fact is full of evolutionary remnants of

ancient "selfish" or parasitic transposable elements and even bacterial sequences inserted by lateral gene transfer events as well? Or are her DNA sequences merely an operational and trivial forensic definition of self?

This is the stuff of plays (e.g. "On Ego" by Paul Brooks currently in the Soho Theater in London) but is it in the realm of science? I believe so since we are indeed the sum of a multitude of symbiotic relationships, both commensal, mutualistic and parasitic in nature, between our own cells and many eubacterial, archaeal and even metazoan creatures that inhabit our universe of self. My students and I never really reach any conclusion about the definition of "I", but the discussion certainly illuminates the nature of symbiotic relationships between organisms and leads directly to a discussion of those relationships which have not yet reached an evolutionary equilibrium and are termed "parasitic".

I myself feel gratified if I have merely stimulated some of those reverberating neuronal circuits of my students and made them stop and think whenever they say "I am so and so." Such are the small but poignant rewards of teaching.

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