Zombies, Predatory Wasps and Consciousness

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Abstract

In anesthetia, a percentage of patients continue to experience the trauma of the surgery despite being anesthisized. Such patients are a form of zombie and there is a need for brain models which can detect this state using measurements that are available in the operating theater. The altered state of consciousness is obtained by the careful administration of a variety of drugs and in many respects is similar to the altered state of behavior induced by a predatory wasp injection of a potent neural cocktail into their cockroach or spider prey. These external events reprogram the host into a new behavioral pattern. Since all of the usual neural modules are present, we can posit that these external inputs alter the usual connections between the functioning neural modules allowing the full brain outputs to change. We explore these ideas using graphs of computational nodes that are assembled into a brain model. We discuss a model of signalling that is built from ideas from computational homology. Within that framework, neural cocktail signals are modeled using Betti decompositions and that information is used to create a new type of computational node in a general graph model of a cognitive system. The Betti node decomposition is a direct sum of simple groups and we posit that the structure of that direct sum is a measure of consciousness level which can be altered by the injection of a toxin or an anathestic drug. Since the notion of *normal* behavior is important here, we discuss how we can ask intelligent questions about how the *normal behavior* – a kind of dynamical attractor – is shifted to the new state.