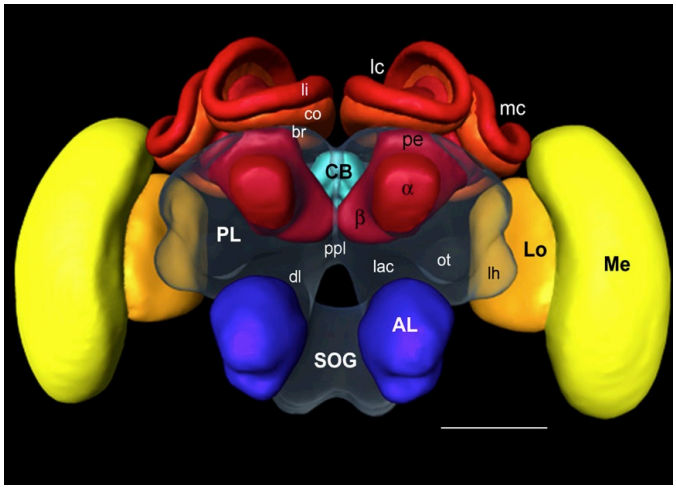
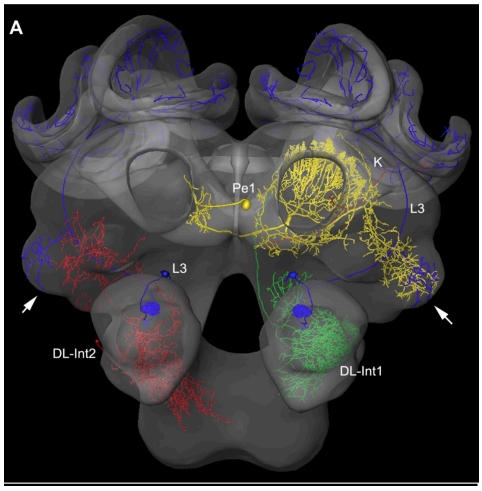
Honeybee Brain

Forty years ago, in 1973, the Nobel Prize in Physiology or Medicine was awarded jointly to three individuals**:** Nikolaas Tinbergen, Konrad Lorenz, and Karl von Frisch, *for their discoveries concerning organization and elicitation of individual and social behavior patterns*. The first two had studied primates and birds. Von Frisch had discovered and decoded the dance language of honeybees.

Of course, using the word *language* to describe a behavior among insects seems outrageous. How could such small animals organize a concept in the first place **…** and then use *symbols* to express this concept to others of their kind (i.e., to *communicate*, which is the function of language)? And how could another bee possibly understand the idea that was being communicated, enough to grasp the concept and then to fly out into unmarked territory – alone – following her mind's-eye map view to navigate to a precise location?

Such ability of an individual – to *conceptualize* locations of far distant sites she has visited and then to express this information *using only symbols* and to be understood precisely by others – requires complex neurological function **…** the honeybee brain provides the anatomy for this. Success and survival of the hive depend on it.





A quick look at the structure of the honeybee brain – small, with a volume of less than 1 mm^3, but intricate, with 1 million neurons, each with many connecting synapses – opens one's eyes, so to speak, to the physiological realities of what is going on.

Here are two excellent references **:**

1) http://www.neurobiologie.fu-berlin.de/menzel/Pub_AGmenzel/Menzel_Leboulle_Eisenhardt_Cell_06.pdf

2) http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2935790/pdf/fnsys-04-00030.pdf