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# The emerging discipline of behavioral neuroimaging

**Daniela Schulz**
*Stony Brook University, USA*

## Abstract

Advances in translational medicine often coincide with the development of new technologies or methods that drive the testing of new concepts, ideas and hypotheses. Imaging technologies have made it possible to study biological systems in the living brain. Important brain functions such as those that mediate learning and memory, motivation and emotion are distributed across the whole brain with different parts of the brain forming multiple interconnections or circuits. Imaging technologies provide insight into some of this complexity and thus, represent an alternative to the traditional reductionist approach to neuroscience. Here I will discuss the idea of behavioral neuroimaging, the simultaneous assessment of dynamic brain processes and behavior using a portable positron emission tomography (PET) scanner for rats termed Rat Conscious Animal PET or Rat CAP. This tomography is so small that it fits between the eyes and ears of a rat's head and allows the whole brain to be imaged while the rat is awake and active. I propose to use the RatCAP in conjunction with short-lived radiotracers that reversibly bind to neuronal receptors and reflect the dynamic and transient states of behavior. I will show examples of PET-behavior correlations from rats that behaved spontaneously or engaged in sexual behavior during the PET scan. Imaging technologies are inherently translational because they are available for use in both humans and animals. It is conceivable that the further development of the behavioral neuroimaging approach will pave the way for a similar application in humans.

## Biography

Daniela Schulz has completed her Ph.D. in Behavioral Neuroscience at the University of Düsseldorf in Germany. She moved to the Unites States for postdoctoral training at Brookhaven National Laboratory where she was introduced to the fields of small animal PET and MR imaging. She currently holds the position of Senior Research Scientist and Research Assistant Professor at Stony Brook University in New York. Dr. Schulz has published more than 25 papers and serves on the editorial boards of Behavioural Brain Research and ISRN Neuroscience.