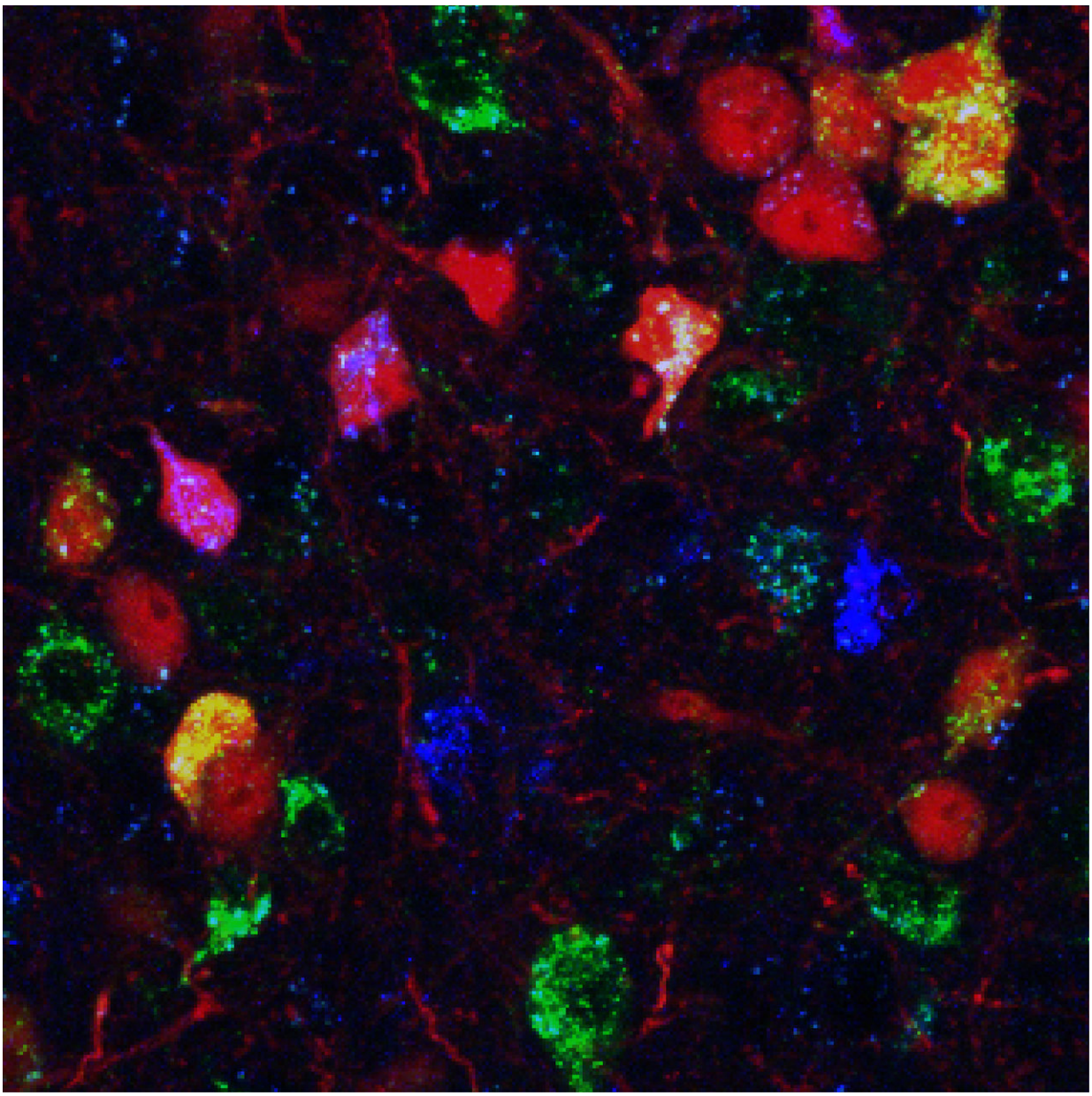
Molecular and cellular biologist wins Eppendorf & Science Prize for Neurobiology for work on mouse brains

October 12 2018, by Bob Yirka



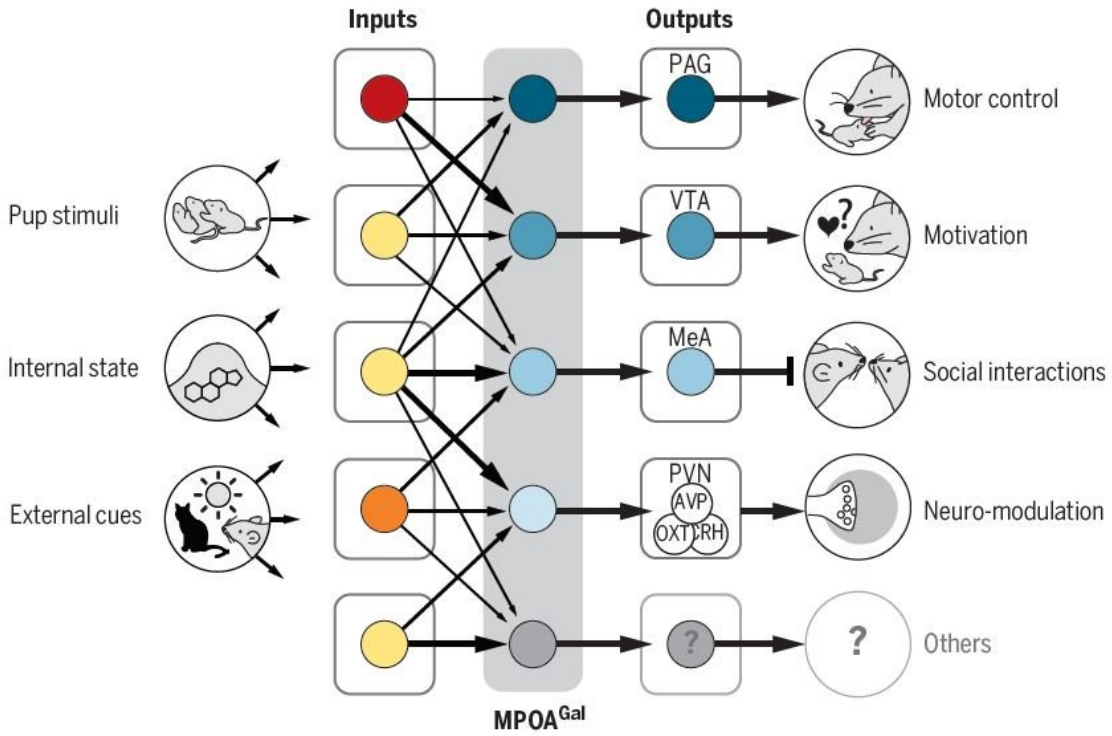
Individual parenting neurons (red) are labeled based on their projections to other brain areas. Credit: Johannes Kohl

Johannes Kohl, a molecular and cellular biologist at Harvard University, has been awarded the grand prize in the Eppendorf & Science Prize for Neurobiology competition. He describes his work in an Essay on Science and Society piece for the journal *Science*. Kohl won for his work studying the mechanics of brain activity in mice as they care for their young.

Kohl's work involved studying a small group of neurons in the mouse brain situated in the medial preoptic area (MPOA) in the hypothalamus. He looked specifically at neurons in the MPOA that included a molecule called Galanin—prior work had shown it to be involved in parental care activities in mice. To learn more about what went on with such neurons during child care, he used imaging techniques to watch as neurons fired while a mouse went about child care duties.

Reviewing the video footage, Kohl discovered that neurons in the MPOA were organized into what he described as individual pools. And each of the pools communicated with different brain regions—sometimes as many as 20 of them. He then focused his efforts on the pools that were most active during times when a given mouse was engaging in a parental activity. Doing so allowed him to identify which them, which led to the discovery of which pools in the MPOA are most involved in controlling how a mouse behaves as it cares for its young. He also found that while the entire MPOA became active during times of parental care, certain pools were individually activated during different parental activities. This suggested that those individual pools were

directly involved in carrying out such activities. Each activity he found, involved communicating with certain other brain regions that were involved in such things as motor control. Interestingly, several of the pools communicated with parts of the brain that have been identified as emotional behavior centers and natural reward monitors. Kohl also found that he could also alter mouse parental behavior by stimulating or deadening nerves in different pools.



Functional architecture of the parenting circuit. Credit: Johannes Kohl

Overall, the work by Kohl was deemed significant by the judging panel because it shed light on the brain circuitry involved in the important activity of parenting.

More information: Johannes Kohl. Circuits for care, *Science* (2018). DOI: 10.1126/science.aav1249