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Children's Hospital Boston researchers win 2009 NIH New Innovator Awards

Researchers to explore the live workings of stem cells and the underpinnings of human consciousness

September 24, 2009

Boston, Mass. -- Children's Hospital Boston scientists Fernando Camargo, PhD, and [Gabriel Kreiman, PhD](#), are among the 55 recipients of the 2009 [NIH Director's New Innovator Award](#), a "high risk" research award given to early-stage investigators whose projects have the potential for unusually high impact.

Fernando Camargo: The secret lives of stem cells

Fernando Camargo, PhD, of [Children's Stem Cell Program](#) received a New Innovator Award to examine the live workings of stem cells to understand how they behave day-to-day in maintaining tissues. Through a novel technique using genetic tags as "barcodes," Camargo will dynamically monitor individual stem cell activity, lifespan, and differentiation--as well as the cells' "offspring"-- in their natural living environment over time. The barcoding technique avoids the shortcomings of previous attempts to tag and track cells, which required manipulations that interfered with the cells' natural functions, and could only loosely indicate the "familial" relationships between cells. Although the work will track stem cells in the blood-forming system in live mice, the model is applicable to a variety of tissues and will yield many insights applicable to human disease and potential treatment by regenerating diseased or damaged tissues. "Our findings ultimately may uncover mechanisms of stem cell maintenance that are perturbed in old age or other disease contexts," Camargo says.

Gabriel Kreiman: Consciousness and visual awareness

The mechanisms of human consciousness have long been a mystery of neuroscience. Gabriel Kreiman, PhD, a neurobiologist in Children's [Department of Ophthalmology](#), received a New Innovator Award to explore the mechanisms of consciousness by studying visual awareness. Past experiments show that we are only aware of a small fraction of the visual input from our retinas, and our perception of shape, size and color is strongly dependent on context. Working with patients undergoing brain monitoring prior to epilepsy surgery, Kreiman and colleagues will examine what types of neurons, circuits and

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Fernando Camargo, PhD



Gabriel Kreiman, PhD

activity patterns are necessary and sufficient to elicit our perceptual visual experience. Through neurophysiological recordings, electrical stimulation and computational models, they will track activity in the brain's visual processing areas at time intervals as small as milliseconds and the spatial resolution of individual neurons. These neural responses will be correlated with patients' reported perceptions during two kinds of experiments: one will present different visual stimuli to the right and left eyes; another will superimpose a moving pattern to make a visible object disappear from perception. "We need to dissociate perception from the cascade of visual processes preceding it," Kreiman says. "In general, what we end up perceiving visually is a substantially transformed version of the visual input."

NIH Director [Dr. Francis S. Collins](#) will announce the recipients at the NIH Director's Pioneer Award Symposium on Thursday, September 24. The New Innovator Awards Program was created by NIH in 2007 to support exceptionally creative new investigators who propose highly innovative, potentially high-reward projects, but who do not have the preliminary data required to fare well in the traditional NIH peer review system. Only early-career investigators who have not held a regular research (R01) or similar NIH grant are eligible for New Innovator Awards.

The NIH is awarding a total of \$348 million over five years to encourage investigators to explore bold ideas, through 115 NIH Director's High-Risk Research Awards. In addition to the 55 New Innovator Awards, the NIH is making 18 Pioneer Awards and 42 Transformative R01 (T-R01) Awards.

For more on the New Innovator Award and the 2009 recipients, see <http://nihroadmap.nih.gov/newinnovator> and <http://nihroadmap.nih.gov/newinnovator/Recipients09.asp>.

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Children's Hospital Boston is home to the world's largest research enterprise based at a pediatric medical center, where its discoveries have benefited both children and adults since 1869. More than 500 scientists, including eight members of the National Academy of Sciences, 12 members of the Institute of Medicine and 12 members of the Howard Hughes Medical Institute comprise Children's research community. Founded as a 20-bed hospital for children, Children's Hospital Boston today is a 396-bed comprehensive center for pediatric and adolescent health care grounded in the values of excellence in patient care and sensitivity to the complex needs and diversity of children and families. Children's also is the primary pediatric teaching affiliate of Harvard Medical School. For more information about the hospital and its research visit: www.childrenshospital.org/newsroom.

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