THE ROCKEFELLER UNIVERSITY

FALL 2018

COMMUNITY CONNECTION

Top national science award recognizes pioneer in epigenetics

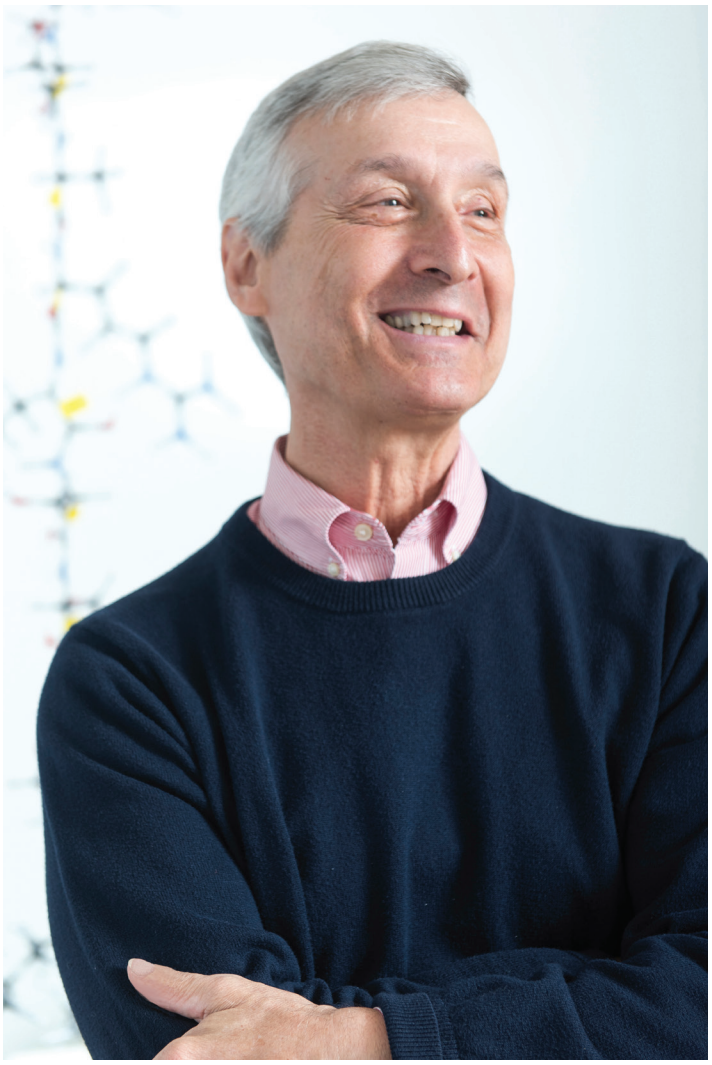

Photo: Zachary Veilleux

C. David Allis is the 23rd Rockefeller scientist to receive a Lasker Award. He works to understand the complex chemistry that allows genes to be switched on or off.

When the human genome was first sequenced in the early 2000s, it was heralded as a breakthrough. Finally, scientists thought, we had the complete recipe for human life. But it turns out that the genome is just one small piece of a complex system that makes an individual.

For C. David Allis, a 2018 winner of the highly prestigious Lasker Award, this was no surprise. While the scientific community celebrated an important milestone, Allis understood that raw data was only the beginning. Since the 1970s, he has focused his work not just on DNA, but on the proteins that compact, package, and protect its delicate strands—known collectively as chromatin.

It turns out that how DNA is stored is as important as DNA itself. The proteins that make up chromatin have the ability to grant or deny access to other proteins in charge of reading that DNA. Chromatin's ability to regulate genes in this way can have as much of an influence on an organism as its genes. The study of these non-genetic, heritable traits is known as epigenetics.

Allis was among the first scientists to recognize just how significant epigenetic factors are in biology. And he was the very first to describe several specific chemical changes that occur within chromatin, and prove that those changes can influence which genes are used. His work to understand these processes, and to identify ways in which they can go awry, has led to the discovery of epigenetic causes for a diverse range of human diseases.

Consider cancer. Most cancer therapies are based on the premise that cancerous cells must be killed. But epigenetics suggests that it may be possible to instead "rehabilitate" cancer cells and make them normal. Some cancers, including certain types of leukemias, are the result not of genetic errors, but epigenetic ones—cells are reading the wrong genes at the wrong times. This is good news, because although it's hard to design drugs that can repair genes, it's more doable to repair mistakes made by chromatin. Experimental drugs designed to do exactly this, developed by Allis and others, are already showing promise in animal experiments.

These possibilities have made epigenetics a hot topic in the biosciences, and many scientists have built on work that Allis and his colleagues have been pursuing for decades.

"The field has taken off in a way I would never have thought possible when we began our studies of histones in the 1990s," Allis says. "I am excited every day about the possibilities presented by our growing understanding of this remarkable system, and I am humbled and deeply honored to be recognized by the Lasker Foundation."

Science briefs

Outsmarting tumors

When cancer cells are deprived of oxygen, they struggle to make aspartate, a molecule vital to cellular function. This recent finding, from the Rockefeller lab of Kivanç Birsoy, suggests that blocking aspartate production may be an effective strategy for fighting tumor growth. Learn more at: go.rockefeller.edu/tumors

Bug bite

Vanessa Ruta and colleagues recently revealed the structure of an insect odorant receptor, shedding light on how bugs evolved their unique senses of smell. Ruta hopes that further research in this area will lead to better insect repellants and a reduction in mosquito-borne illnesses. Learn more at: go.rockefeller.edu/insects

Locating lost brain cells

For many years, researchers believed that subplate cells, a type of neuron, appeared and then promptly disappeared during development. Ali Brivanlou's lab recently proved otherwise, showing that subplate cells (right, in green) become incorporated into the brain's cortex as it matures—a finding that may yield new advances in stem-cell therapy. Learn more at: go.rockefeller.edu/subplate

Ali Brivanlou lab, The Rockefeller University

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Clinical trials

The Rockefeller University Hospital, a unique facility devoted exclusively to clinical research, is recruiting volunteers to participate in several innovative trials.

Appendicitis and families

Does appendicitis run in your family? Rockefeller researchers are conducting a study to understand if there are certain genes associated with appendicitis.

More at go.rockefeller.edu/appendicitis.

Alopecia areata

Living with alopecia areata? Rockefeller researchers are conducting a study to assess whether dupilumab can be a helpful treatment for alopecia areata.

More at go.rockefeller.edu/alopecia.

Over 100 other clinical studies are currently underway at Rockefeller. Explore them at www.rucares.org or call 1-800-RUCARES.

Upcoming event

OCTOBER 13-14 10 A.M. TO 3 P.M.

Open House New York: Tours of The Rockefeller University campus

Get a free guided tour inside the world's leading biomedical research university, and visit several buildings including the historic library. No tickets or reservations required.

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