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## CIRM Approves New Funding to UC San Diego Researchers Fighting Zika Virus and Cancer

**Grants focus on re-purposing drugs to treat Zika infections and using anti-cancer natural killer cells**

The Independent Citizens Oversight Committee of the California Institute for Regenerative Medicine (CIRM) has approved a pair of \$2 million awards to University of California San Diego School of Medicine researchers to advance studies of new treatments for Zika virus infections and the use of stem cell-derived natural killer (NK) cells to target ovarian cancer and other malignancies.

The Zika virus is linked to increased birth defects, most notably microcephaly — newborns with smaller than expected heads and abnormal brain development. But the virus can also impact infected adults, resulting in conditions such as Guillain-Barre syndrome, meningoencephalitis, uveitis and acute myelitis — all disorders of the immune system affecting different parts of the body.

While there is an on-going, accelerated international effort to develop a preventive Zika vaccine, researchers say the need is critical, too for pharmacological treatments of already infected individuals, including pregnant women for whom prevention is no longer an option.

“There is urgent need to move as quickly as we can into clinical trials and, hopefully, find an effective treatment,” said Alysson R. Muotri, PhD, professor in the UC San Diego School of Medicine departments of Pediatrics and Cellular and Molecular Medicine and director of the UC San Diego Stem Cell Program. “This is especially true of infected mothers where a Zika infection during the first trimester of pregnancy appears to pose the greatest risk of congenital microcephaly.”



*UC San Diego School of Medicine researchers Alysson Muotri, PhD, and Dan Kaufman, MD, PhD, have received funding from CIRM for research on Zika infection and “off-the-shelf” immunotherapy.*

In an oversight committee vote yesterday, Muotri and colleagues received a \$2.1 million award to investigate anti-viral drugs developed for other infectious diseases that might also work against a Zika infection. The team already reports promising results, suggesting that some FDA-approved drugs may indeed be effective against the virus.

“Of course, these are preliminary findings in cellular and animal models,” said Muotri, “but given the nature of the health crisis we are extremely encouraged. The CIRM grant represents a similar belief and hope in others. It is our plan and goal now to press ahead, to get our data vetted and validated, and to develop an effective treatment for Zika as quickly as possible.”

Dan Kaufman, MD, PhD, professor of medicine in the Division of Regenerative Medicine and director of cell therapy at UC San Diego School of Medicine, and his laboratory have developed an efficient process to produce NK cells from induced human pluripotent stem cells (iPSCs).

“NK cells are part of the normal immune system and are known to kill certain tumors and virally-infected cells,” said Kaufman. “Here, we are using the advantages of iPSCs to make NK cells with improved anti-cancer activity.”

The CIRM committee awarded Kaufman and colleagues a \$2.1 million grant to create an “off-the-shelf immunotherapy” using NK cells to treat refractory or resistant tumors, such as ovarian cancer. “Unlike current immunotherapies produced on a patient-specific basis, iPSC-derived immune cells can be targeted to tumors with high specificity, no off-target effects and without need for patient matching,” said Kaufman, who is collaborating with Karl Willert, PhD, associate professor in the Department of Cellular and Molecular Medicine at UC San Diego School of Medicine.

Another aspect of Kaufman’s approved proposal is to optimize the ability of iPSC-derived NK cells to kill leukemia cells. Kaufman and colleagues will conduct animal studies with the goal of translating findings to clinical therapies for cancers that would otherwise prove lethal.

Both Muotri and Kaufman are members of the Sanford Consortium for Regenerative Medicine, a joint effort by UC San Diego, the Sanford Burnham Prebys Medical Discovery Institute, the Salk Institute for Biological Studies, The Scripps Research Institute and La Jolla Institute for Allergy and Immunology to collaboratively advance stem cell research and clinical therapies. The consortium was launched in 2006.

CIRM was created in 2004 by California voters with \$3 billion in funding support to accelerate stem cell research and treatments. Since 2004, UC San Diego researchers have received at least 90 CIRM awards, totaling more than \$169 million.

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