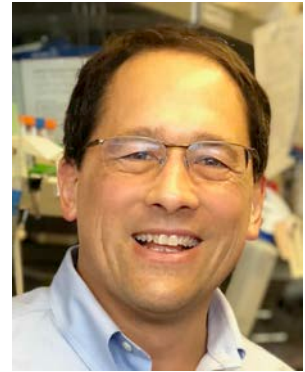


Faculty Spotlight:

Anthony Oro, MD, PhD



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*Eugene and Gloria Bauer Professor of Dermatology
Co-Director for the Stanford Child Health Research Institute
Co-Director of the Center for Definitive and Curative Medicine*

Summary of Work

For Dr. Anthony Oro, the skin offers a window to the inner workings of the human body. “Studying this tissue gives us insights into stem cell biology, immunology, cancer, aging, infection, and the microbiome,” he says. Because skin is the organ that mediates our experience with the world, it can be used as a tool to effectively answer fundamental biological questions.

In his lab, Dr. Oro uses skin as a model for Precision Health, to understand the genetic basis of diseases and develop novel therapies for tissue regeneration, cancer and autoimmune conditions. His team pioneered a technique called “Therapeutic Reprogramming” to treat epidermolysis bullosa, a rare blistering skin disease. Using the latest in stem cell biology, genome editing, and tissue engineering techniques, the team converted patients’ adult stem cells into induced pluripotent cells (iPS), a type of stem cell which can be made into any human cell. By correcting the genetic code causing disease inside the cell using a technique called CRISPR, the team was able to grow healthy cells in laboratory dishes. Now these cells can be grown into sheets of skin and grafted to repair diseased and damaged tissue.

“It’s a revolutionary idea to use cells and tissue as drugs to actually cure diseases that we haven’t been able to cure with surgery and medicine,” Oro says.

As co-director of the Center for Curative and Definitive Medicine, Dr. Oro works to scale-up and expand the use of corrected, iPS-derived therapies to provide personalized treatments for the millions of people who suffer from genetic diseases. The center uses the specially designed Stanford Laboratory for Cell and Gene Medicine, a 9000-square foot manufacturing facility, to produce cell and gene therapies in accordance with the FDA’s Current Good Manufacturing Practice standards.

In addition to genetic disorders, Dr. Oro and his team are working to engineer “functionalized” tissue with pigment, sweat glands, and hair to treat a variety of disorders. “At Stanford, we have a group of folks who work in the lab, others who work in translational medicine, and clinical trials people,” Oro said. “Our department has a vertically integrated program where we can go right from the lab into the clinic. It’s a unique feature.”

In other transformational work, Dr. Oro was part of a team that first uncovered the link between the Hedgehog pathway and basal cell carcinoma, the most common type of skin cancer. The Hedgehog pathway is a series of molecular interactions that determine cell function and cell growth. When activated inappropriately in the skin it leads to tumor development. The team's research showed by blocking the pathway they could reduce the size of tumors and stop the spread of cancer cells. Dr. Oro conducted clinical trials that led to the first FDA-approved Hedgehog Pathway inhibitor that is now used by dermatologists around the world to treat skin cancer. Since the Hedgehog pathway has been found to be abnormally active in other cancers – including pancreatic, colon, lung, and breast cancers, as well as the brain cancer medulloblastoma – the therapies that Dr. Oro and his team are developing may be useful in treating many more cancer patients.

In recent work, Dr. Oro's group has investigated how tumors evolve to escape cancer therapy. They have discovered several new tumor resistance mechanisms in skin cancers that are operative in other types of cancers. They have developed small molecule therapies to these new escape pathways and plan on treating the resistant tumors in the future.

Also as the Director of the Stanford Hair Loss Clinic, Dr. Oro is pioneering new treatments for hair loss disorders. He recently collaborated with researchers at Yale to provide the most conclusive evidence to date that a rheumatoid arthritis drug can be repurposed to grow hair on patients with alopecia areata, an autoimmune disease that causes patchy or complete hair loss.

Biography

Recently named the Eugene and Gloria Bauer Professor of Dermatology, Dr. Oro is a professor of dermatology, associate director of the Center for Definitive and Curative Therapy in the Stem Cell Institute, and a member of Bio-X, the Child Health Research Institute, and the Stanford Cancer Institute. He is board certified in dermatology by the American Board of Dermatology. He earned his medical and doctorate degrees at the University of California, San Diego School of Medicine and the Salk Institute before completing his internship and residency at Stanford University School of Medicine. He is a member of the American Society for Clinical Investigation and the American Skin Association.

Dr. Oro is a recognized leader in skin regeneration and cancer. His research includes more than 75 publications in top journals such as *Nature*, *Science*, *Nature Medicine*, *Developmental Cell*, and *Science Translational Medicine*. He is the holder of 16 U.S. patents and the recipient of the Marion Sulzberger and William Montagna Lectureships, two of the top awards in the field of dermatology.

Dr. Oro is passionate about training the next generation and has mentored over three dozen undergraduate, graduate and postdoctoral fellows in his lab, many of whom have gone on to their own research careers.

An avid runner and passionate soccer fan, Dr. Oro can often be found running the trails around Stanford's campus or debating his kids about which is the best team in the Premier League.



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