Scientists Turn COVID-19 Immune Memory into a Powerful New Ally Against Cancer

PROTEXI experimental cancer vaccine slowed tumor growth and improved survival in preclinical studies.

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CLEVELAND — In a discovery that could redefine the future of cancer immunotherapy, scientists from Celloram Inc., University Hospitals and Case Western Reserve University have developed a novel cancer vaccine platform that transforms the impact of the largest immunological event in modern history – a synchronized mass immune memory generated through SARS-CoV-2 infection and vaccination – into a powerful ally against cancer.

Published today in Nature Communications, the study introduces PROTEXI, an innovative dendritic cell vaccine platform designed to harness pre-existing antiviral immune memory to amplify the body's natural ability to recognize and destroy tumors.

The findings suggest a fundamentally new approach to cancer vaccine design: rather than building entirely new immune responses from scratch, clinicians may be able to redirect immune memories already present in billions of people toward fighting cancer.

Cancer vaccines have long held tremendous promise, yet many have struggled to generate sufficiently robust and durable immune responses, particularly in so-called "immune-cold" tumors that evade immune recognition and remain resistant to existing therapies.

PROTEXI was specifically designed to overcome this challenge.

By pairing tumor-specific antigens with helper signals derived from SARS-CoV-2 Spike protein epitopes (small Spike protein fragments recognized by immune systems primed through prior infection or vaccination), PROTEXI converts dormant antiviral memory into a catalyst for antitumor immunity.

In multiple preclinical models of melanoma and breast cancer, PROTEXI slowed tumor growth, improved survival, and transformed tumors that typically evade the immune system into ones that could be more effectively recognized and attacked. The vaccine strengthened the body's natural

cancer-fighting defenses, generated long-lasting immune memory that may help prevent recurrence, and worked even better when combined with other immunotherapies. Importantly, its effectiveness was also demonstrated in humanized mouse models using immune cells from COVID-19-vaccinated donors.

The study showed that PROTEXI leverages pre-existing antiviral CD4+ helper T-cell immunity to strengthen tumor-specific CD8+ cytotoxic T-cell responses and generate durable antitumor memory, representing a significant advance over conventional dendritic cell vaccines. The platform significantly reduced tumor burden and improved survival in multiple preclinical models.

A New Paradigm in Cancer Vaccines

“Rather than inventing a completely new immune response, we are enhancing the ability of the immune system to recognize cancer by leveraging antiviral memories it already has,” said Dr. Tej Pareek, Chief Executive Officer of Celloram Inc.

“At Celloram, we believe that breakthrough innovation often comes from looking at familiar challenges through an entirely new lens. Instead of asking how to build increasingly complex cancer vaccines from scratch, we asked a different question: Can we harness the immune memories that billions of people already possess and redirect them against cancer?”

“PROTEXI represents that ingenuity. By transforming pre-existing antiviral immunity into a therapeutic advantage, we believe this platform has the potential to overcome some of the most fundamental limitations that have hindered cancer vaccines for decades.”

“Equally important, this work demonstrates the power of collaborative innovation between academia, clinicians, and biotechnology entrepreneurs. We are tremendously grateful to our partners at University Hospitals, Case Western Reserve University, and MedPacto, whose shared vision made this possible,” Pareek continued. "Building upon these exciting findings, we are actively advancing PROTEXI toward first-in-human clinical evaluation in patients with sarcoma in partnership with University Hospitals. Our ultimate goal is simple yet profound: to translate scientific discoveries into meaningful therapies that extend and improve the lives of patients who currently have limited treatment options."

Scientific Discovery Meets Clinical Translation

“We sought to answer a fundamental question: could the immune system’s memory of a viral threat be repurposed to recognize and eliminate cancer more effectively?” said Dr. Seunghwan Lim, corresponding author and Vice President of Research and Operations at Celloram Inc.

“The preclinical data exceeded our expectations. PROTEXI not only enhanced tumor-specific immune responses but also reshaped the tumor microenvironment, expanded immune memory, and improved responses in models resistant to current therapies. We believe this strategy has the potential to redefine how future cancer vaccines are designed.”

From Discovery to Patients

“For decades, researchers have recognized the importance of helper T cells in generating durable antitumor immunity, yet identifying clinically useful helper signals has remained a major challenge,” said Dr. John Letterio, senior corresponding author, director of the Angie Fowler Adolescent and Young Adult Cancer Institute at University Hospitals Rainbow Babies & Children’s Hospital, and co-leader of the Developmental Therapeutics Program of the Case Comprehensive Cancer Center.

"PROTEXI offers a compelling solution by redirecting robust antiviral immune memory toward tumor eradication. What excites us most is the translational promise of this approach. These findings have provided the scientific rationale to advance this platform into first-in-human studies for patients with sarcoma, a disease where innovative immunotherapeutic approaches are urgently needed."

“This publication in Nature Communications marks an important milestone for Celloram, but for us, it is only the beginning of what we hope will become a new chapter in precision cancer immunotherapy,” Letterio added.

Leveraging One of Humanity’s Largest Immune Experiments

“For many years, cancer immunotherapy has focused on identifying increasingly sophisticated ways to stimulate antitumor immunity,” said Dr. Seong-Jin Kim, co-founder of Celloram and chairman of MedPacto Inc.

"What is particularly elegant about PROTEXI is that it leverages one of the most powerful biological resources already present within the human population: pre-existing antiviral immune memory. The concept is both innovative and practical. Instead of relying solely on the difficult task of identifying effective tumor-specific helper antigens for every patient, this strategy harnesses highly immunogenic viral responses that already exist in most individuals. The result is a potentially more robust, coordinated, and durable antitumor immune response."

“The translational potential of this platform is especially exciting because it opens opportunities for broad applicability across multiple cancer types and combination strategies with existing immunotherapies,” Kim said.

Advancing Toward First-in-Human Clinical Trials

Building on these findings, Celloram and University Hospitals Cleveland Medical Center are advancing the PROTEXI platform toward a first-in-human clinical trial in patients with sarcoma. The planned study will evaluate the safety, feasibility, and immunologic activity of this personalized dendritic cell vaccine approach and represents an important step toward translating this discovery from the laboratory into a potential treatment for patients facing cancers with limited therapeutic options.

While additional clinical studies are necessary, the investigators believe these results establish a compelling scientific foundation for a new generation of cancer vaccines capable of transforming the immune system’s existing memories into precision therapies.

If successful, PROTEXI may offer hope not only for patients with sarcoma, but also for a broad range of immune-cold and therapy-resistant cancers that continue to evade today’s treatments.

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http://beta.docker.covidhealth.com/article/scientists-turn-covid19-immune-memory-powerful-new-ally-cancer