



CATALYZING THE DEVELOPMENT OF LIFE-SAVING CANCER TREATMENTS

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Located on Penn Medicine's campus in Philadelphia amidst both clinical care and laboratory facilities, the 30,000 sf Center for Advanced Cellular Therapies (CACT) brings together Penn Medicine's intellectual resources combined with pharmaceutical industry leader Novartis with the mutual goal of expediting the development of novel gene therapies for complex diseases of all kinds. The CACT expands on Penn's groundbreaking research using Chimeric Antigen Receptor (CAR) technology, which enables a patient's own immune cells to be reprogrammed outside of their body and re-infused to "hunt" for and potentially destroy tumors. The design team saw an opportunity to implement innovative design concepts that increase program efficiency, double process efficiency and increase communication and collaboration between researchers.

The CACT, a cGMP facility, was constructed as part of the vertical expansion of the Perelman Center for Advanced Medicine on Penn Medicine's University City campus. It adjoins the existing cancer therapies floor in the Smilow Center for Translational Research, allowing it to be fully integrated with Penn Medicine's research and clinical operations. The center employs 100 highly-specialized professionals working across 6,300 sf of clean room space specially designed for cell engineering and 24,000 sf of laboratory and cell therapy manufacturing space with the capacity to manufacture cellular therapies for up to 400 patients per year.



High-Rising to the Challenge

Unlike many traditional cGMP manufacturing facilities, the CACT's integration into a high-rise facility is unique. In order to comply with the FDA's regulations for cGMP manufacturing environment, the design team utilized a modular clean room system to create a "box within a box" design approach. The modular clean room system allowed the design team the flexibility to mold and shape the clean room manufacturing environment into the boundaries of the high-rise envelope. While the team respected the transparency of high-rise curtain wall facades for daylighting and view, it was critical to maintain clean room standards.

Bringing the Full Team Together

At the outset of the engagement, Penn Medicine initially programmed that they would put three of its Principal Investigator (PI) teams in the CACT and another on a separate floor. These four PI teams are uniquely focused on different aspects of the research: Clinical Cell and Vaccine Production Facility, Quality Control Lab, Translational and Correlative Studies Lab, and then Product Development Lab.

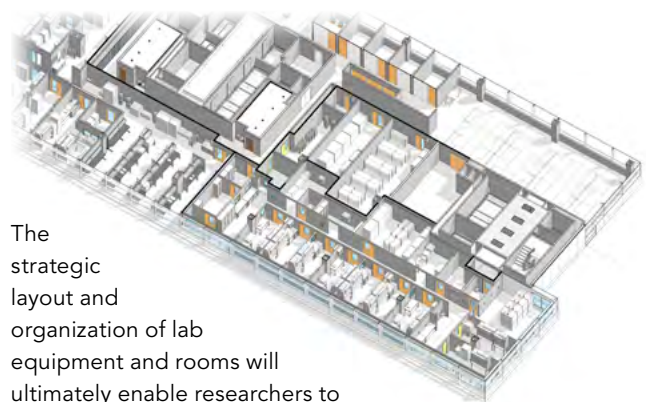
CannonDesign was able to model the original plan and find a way to effectively bring the fourth PI team into the CACT. This **increased the programming efficiency of the space by 25%** and strengthened collaboration and communication compared to the original solution, which did not bring the teams together in such a way. This will help the team work more effectively and increase speed-to-market.



Strategic Layout

Ideally located above Abramson Cancer Center of the Perelman Center for Advanced Medicine, the CACT houses translational research, CAR-T therapy production, and quality control lab. The researchers and technicians are encouraged and agreed that less frequently utilized lab support spaces and lab equipment should be shared within the CACT.

Each processing room is identically planned and equipped for streamlining processes. Pass-throughs are located for incoming and outgoing materials, samples, and waste so staff do not need to leave the cGMP facility if not desired. After exploring a single corridor option vs. double corridor of clean and waste option, processing rooms and lab support spaces are organized on either side of a single corridor, which yields processing rooms and primary work environments with abundant daylighting for increased collaboration, productivity and employee happiness.



The strategic layout and organization of lab equipment and rooms will ultimately enable researchers to **reduce the process of creating the "hunter cells" for one patient by 50%**. At the outset of this effort, it took an entire month to tackle this for each patient. Ultimately, this new facility will bring that time down to two weeks.



Designing the Future Scientific Workplace

While the CACT is primarily a lab and research space, CannonDesign not only brought the technical lab planning team, but also its corporate workplace design and strategy team to create the best workplace environment possible. The CACT is designed with a centralized café space, more akin to a campus center destination, where people naturally gravitate to for social interaction and connection. Along with the interactive café, several other collaborative spaces are infused throughout the space that support meaningful engagement and a dynamic work environment to foster discovery.

Due to unique limitations of vertical expansion over clinical use, an open lab concept was used to maximize daylighting and view. Open meeting areas are integrated into open office areas for casual interaction. Penn Medicine has embraced the open plan concept where researchers sit and work within without separate offices. Writable walls are planned throughout spaces for ad-hoc-collaboration and one central work café functions as a social hub for collaboration and social connection in a less stressful environment.

About CannonDesign

CannonDesign is an integrated, global design firm that unites a dynamic team of strategists, futurists, researchers, architects, engineers and industry specialists, driven by a singular goal — to help solve our client's and society's greatest challenges.

Contact Information

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