

Next-Generation CRISPR-Barcoded Organoid-Mouse Models for Prostate Cancer Drug Discovery and Immunotherapy Research

Tech ID: 34549 / UC Case 2024-218-0

TECHNOLOGY DESCRIPTION

UCSF inventors have developed an innovative prostate cancer research platform that combines CRISPR-induced mutational heterogeneity with DNA/RNA barcoding to create genetically diverse organoid models derived from backcrossed mice. By implanting these organoids into immunocompetent mice, researchers can study immune responses, tumor progression, and mechanisms of therapy resistance in vivo. The system addresses limitations in current models, such as xenografts and PDX, which rely on immunocompromised mice and are unable to evaluate immune therapies or immune evasion mechanisms. Using CRISPR to tune mutational heterogeneity and barcoding to trace individual cell lineages, this platform enables the profiling of tumor cells before and after therapy, the identification of drug-resistant and sensitive populations, and the analysis of precancerous cells for genetic alterations. Early validation demonstrates its potential for drug discovery, immunotherapy research, and studying castrate-resistant prostate cancer (CRPC), an aggressive form of PC with limited treatment options.

RELATED MATERIALS

- ▶ [Stochastically Emergent Tumors offer in vivo whole genome interrogation of cancer evolution from non-malignant precursors. bioRxiv. 2025, PMID: 40166351; PMCID: PMC11956934. - 03/18/2025](#)

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OTHER INFORMATION

KEYWORDS

Prostate cancer organoid models, CRISPR-based drug discovery platform, Immunotherapy research technology, Caste-resistant prostate cancer (CRPC) innovation, Tumor heterogeneity and immune response analysis

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Genomics
- ▶ **Medical**
 - ▶ Disease: Autoimmune and Inflammation
 - ▶ Disease: Cancer
- ▶ **Research Tools**
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