Generation and culture of prostate tissues and organoids for drug screening and development

Technology #cu13124

One of the most significant challenges facing oncology research is the difficulty in translating results gained from cell culture based assays to organismal, in vivo models. This technology describes a method for generating and culturing organoids and tissues from prostate cells. These two types of cellular structures each contain differentiated and specialized cells, allowing them to better recapitulate the complexity of whole-organism biology while preserving the operational ease of conventional cell culture. As such, this technology provides a sensitive yet robust platform for screening and developing drugs against prostate cancer – the second leading cause of cancer among American men.

Patient-derived organoids and tissues allow for greater clinical translatability and development of personalized therapeutics

By virtue of their ability to maintain the phenotypic differentiation accompanying tissue formation, this method of cell culture is able to better emulate the complex biology of whole tissues and organs in vivo. Moreover, since the organoids and tissues are derived from patient cells, this technology has great potential for the development of personalized medicines and therapeutic regimens. Organoids are derived from castration-resistant Nkx3.1-expressing cells, or CARNs. These cells share properties with stem-cells and are thought to be one of the origin cells of prostate cancer. Tissues can be cultured using fibroblasts, virally transforming them first into epithelial cells and subsequently into differentiated tissue types.

In both systems, the resulting tissue or organoid has been demonstrated to retain its luminal differentiation and structure in in vitro studies. Such patient-specific tissue and organoid development permits accurate in vitro modeling of prostate disease and screening of therapeutic agents.

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Applications:
- Patient-specific screening of potential therapeutic agents (drugs) for targeted treatment of prostate cancer.
- Rapid diagnosis of malignant disease in human specimens.
- In vitro large-scale screening of candidate vaccines or therapeutics for pharmaceutical development.
- Creation of tissue libraries of malignant tissue for research use.
- Research tool for studying the biology of malignant transformation in prostate cells.
Advantages:

• Allows long-term maintenance and culture of human prostate tissue, both cancerous and healthy.
• Cultured cells retain the biological activity and phenotype of cells in the source organ.
• Uses patient-derived cells to start tissue and organoid formation

Patent information:

Patent Pending (WO/2014/082096)

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Related Publications:


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