Human cerebral organoids provide new opportunities for cancer treatment development

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Abstract

Organoids are 3-dimensional structures built in the laboratory from human pluripotent stem cells (hPSCs) to mimic human tissues and organs and have paved the way for research into new disease treatments that would never have been possible with traditional approaches. One field that is notably benefiting from the use of organoids is cancer research, particularly the study of glioma, the most common type of tumor originating in the brain. Poor outcomes are often associated with glioma because of its rapid growth and resistance to chemotherapy, but cerebral organoids hold promise for the development of novel treatments for this type of cancer, as they can be used as valuable tools to track tumor development and screen new drugs. Human cerebral organoids can also be grown from a patient's own tissues for the creation of personalized cancer treatments, and they can be genetically engineered to study how common gene mutations affect tumor cells. While some shortcomings in the use of cerebral organoids in cancer research have yet to be addressed, such as their slow maturation rate and the absence of associated cell types in culture, they provide important new opportunities to advance cancer research.