

Studying radiation effects with brain “organoids” made from iPS cells

Understanding how radiation affects the human body is a crucial area of research—not only for supporting the health and well-being of atomic bomb survivors, but also for ensuring future advances in medicine and serving as the foundation for radiation protection. In terms of research into how radiation affects human health, one method attracting increased attention in recent years involves the use of “organoids.” Organoids are miniature, three-dimensional versions of organs made from induced pluripotent stem (iPS) cells and stem cells found in body tissues. By growing such cells under controlled laboratory conditions, researchers can reproduce some of the structures and functions of the actual organs. However, organoids are not actual organs; they are only models designed for use in research to help understand how the human body works.

Today, it has become possible to create organoids representing a variety of organs. Progress continues to be made in research combining multiple organoids to reproduce conditions close to those found in the human body. In the area of radiation research, studies increasingly use organoids of the intestine, liver, skin, brain, and other organs to investigate how cells and tissues change when exposed to radiation.

This paper, with its specific focus on brain organoids, describes how to create organoids using iPS cells, as well as specific examples of how they are utilized in radiation research. While using organoids will allow more detailed investigation of how radiation affects human tissues, organoids cannot be used to reproduce the entire human body. Therefore, results from organoid studies need to be interpreted carefully alongside findings from other types of research, including animal studies, epidemiological studies, and clinical research. Organoid research is expected to develop further as an important scientific approach for gaining deeper understanding about the health effects of radiation, and for contributing to future advances in radiation protection and medicine.

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RERF’s objective with this brief outline is to succinctly explain our research for the lay public. Much of the technical content of the original paper has been omitted. For further details about the study, please refer to the full paper published by the journal.