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Global initiative seeks 1,000 new cancer models

The effort will use next-generation cell-culture methods and fresh patient samples.

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An international collaboration of cancer-research heavy-weights aims to grow 1,000 new cell lines for scientists to study — and that could be just the beginning.

The Human Cancer Models Initiative announced its pilot project on 11 July, and intends to complete the initial 1,000 models within 3 years. Members of the initiative include the US National Cancer Institute (NCI) in Bethesda, Maryland; Cancer Research UK in London; the Wellcome Trust Sanger Institute in Hinxton, UK; and Hubrecht Organoid Technology of Utrecht in the Netherlands.

The initial goal of 1,000 cell lines would roughly double the world's collection of accessible cancer cell models, says Louis Staudt, head of the NCI's Center for Cancer Genomics. But if all goes well during the pilot, the project will generate thousands more. Staudt estimates that researchers need about 10,000 models to fully capture the diversity of relatively common genetic subtypes of cancer. "Whether we actually will push into that depends a lot upon how easy and valuable the cell lines are from the pilot," he says.

Reflections of reality

The initiative's models will offer several improvements over most available cell lines. Each line will be matched with clinical data about the donor patient, and how they responded to treatment. The project will also use cutting-edge techniques to generate its models, which will include 3D cultures called organoids, and cells that have been reprogrammed to grow indefinitely in culture.

The hope is that these features will better reflect human cancers, enabling the cells to be used to model disease, screen for new drugs and determine which treatments are suited for which cancers.

Umber Cheema, a tissue engineer at University College London, says that the initiative is an exciting opportunity to unite protocols and expertise from different research groups. "It's been a little bit disjointed, in terms of different people in different countries working on their specific models," she says. "We have so much we can share with each other."

The pilot project will give members of the initiative a chance to work out the kinks in their protocols, searching for ways to make their pipelines cheaper and more efficient, says Mathew Garnett, a cancer researcher at the Sanger Institute. A key stumbling block can be establishing a network of clinics able to collect samples — and consent forms — and rush them to research labs to generate the models.

At the NCI, the Human Cancer Models Initiative will be paired with another effort to create a large collection of human cancer cells that have been grown in mice. Cell lines generated from that project will be fed into the cancer-models initiative, says Staudt.

The NCI is also interested in exploring other methods of deriving cell models — a hot field in cancer research. Staudt notes that groups are working to find optimal conditions for difficult-to-grow cancer cells, such as lymphoma. Others are trying to refine current models so that they better reflect a tumour's natural environment. Cheema's group, for example, grows cells in 3D cultures that reproduce some aspects of a tumour's environment, and even contain a rudimentary vascular system. Her team hopes to refine the technique so that it can be used to determine whether an individual's cancer cells is likely to be metastatic, or to respond to a given therapy.

"There are people out there with their own special sauce," says Staudt. "We are open to all of these opportunities."

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