Transporting

Retinal Organoids for single-cell RNA-Sequencing

Opthalmic Oncology & Genetics Group; Institute of Human Genetics

The clinical research group “Ophthalmic Oncology and Genetics” was set up on this basis. The special outpatient clinics in the eye and children‘s clinic as well as in human genetics form the basis of the research group. On this basis, a network of scientific projects was built up in three project areas, which deal with questions from the intersection of clinical and basic research.

Opthalmic Oncology & Genetics Group;
Institute of Human Genetics

> “Due to the expensive subsequent single cell RNA sequencing (3 samples ≈ 10000€), the high risk of failure when transporting in an uncontrolled environment made the Cellbox the only feasible transport option.

THE PROJECT

An organoid is an in vitro 3D cellular cluster derived from primary tissue, embryonic stem cells, or induced pluripotent stem cells, capable of self-renewal and self-organization, and exhibiting similar organ functionality as the tissue of origin. The 3D hPSC-derived Retinal organoids are one application of this novel model. This project summarises the transport of these complex structures and subsequent evaluation for single-cell RNA-sequencing.

Single-cell sequencing refers to the sequencing of a single-cell genome or transcriptome, to obtain genomic, transcriptome or other multi-omics information to reveal cell population differences and cellular evolutionary relationships. It requires the isolation and lysis of single cells, conversion of their RNA into cDNA, and the amplification of cDNA to generate high-throughput sequencing libraries.

In this study, researchers packaged the organoids according to guidelines before being transferred into the pre-conditioned chamber of the Cellbox Flight CDI. The transport parameters were set at 37°C and 5% CO2 prior to being transported. The Cellbox departed Essen by 9:50am.

Upon arrival in Münster at 11:40am, microscopic examinations were done which revealed no difference in appearance when compared to images taken before the transport.
The organoids were transferred into a stationary incubator, and 4 days later, the preparation for single-cell RNA-sequencing, including dissociation and library preparation, was successfully carried out.