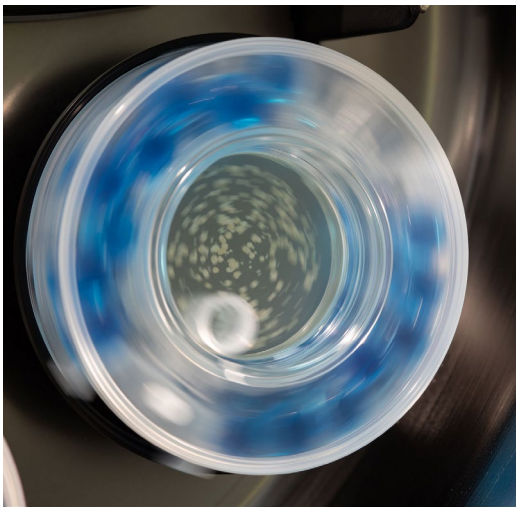
ClinoStar Hypoxia Unit

Using hypoxia for 3D Cell Culture Research

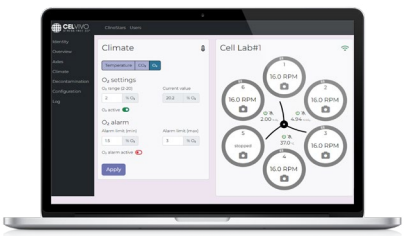
Accurately establishing and monitoring oxygen levels during the culture period is crucial to mimic in vivo physiological conditions of tissues or organs. In the majority of traditional cell culture experiments, a standard cell culture incubator atmosphere of 5% CO_2 in air is used, resulting in approximately 19% oxygen and creating non-physiological conditions.

Oxygen concentrations in the human body vary, ranging from around 12% in the lungs to 5% in the brain, and as low as 0.1% in tumor tissues. The ClinoStar hypoxia unit enables the manipulation of in vitro atmospheric composition to tailor it to the specific physiological needs of tissues or organs.



Advantages of using hypoxia in the ClinoStar

- ◊ Ability to regulate level of oxygen from atmospheric to 2%
- ◊ Rapid attainment of the media's oxygen level set point is achieved through active gas exchange between the ClinoStar and the ClinoReactor humidification chamber.
- ◊ The ClinoReactor's semi-closed environment temporarily preserves hypoxic conditions for operations within a normal (21%) atmospheric oxygen environment. This simplifies short-term handling procedures, such as microscopy observation and documentation.



Learn more about hypoxia at
CelVivo.com/products/clinostar

CELVIVO
STRESS-FREE 3D™

Working with the hypoxia module in the ClinoStar

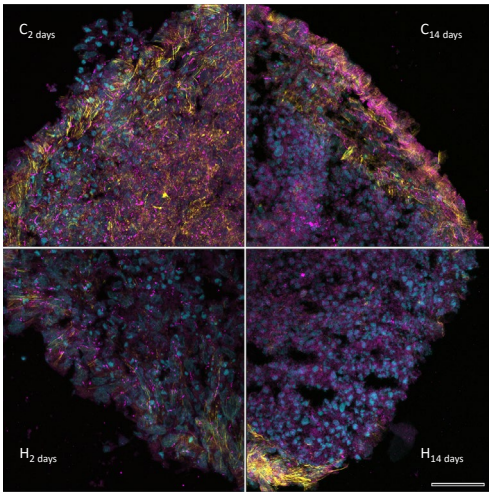
Anne Agger
Doctoral Fellow,
Centre of Functional Tissue Reconstruction, University of Oslo

When the ClinoStar met the FUTURE

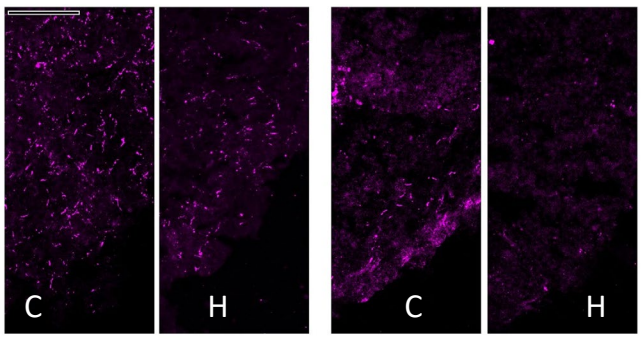
At the Centre of Functional Tissue Reconstruction (FUTURE) at the University of Oslo, Professor Reseland and Dr Samara have employed the ClinoStar platform and have been working towards several lineages of innovative models to study hypoxia.

Anne Agger, shares her preliminary findings, the structural changes in fibroblast spheroids cultivated for 14 days under both normoxic and hypoxic conditions. Through immunofluorescent labeling, the magenta-acetylated tubulin staining enables the visualization of reduced primary cilia,
suggesting downstream molecular effects of targeted hypoxia.

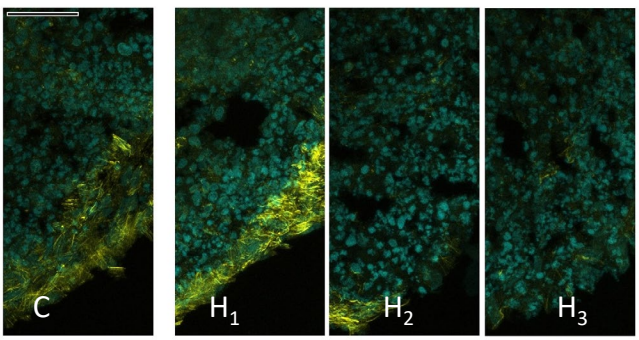
Meanwhile, actin in yellow vividly illustrates the heterogeneous morphological transformation of the rim of the spheroid.
Notably, hypoxia exerts significant effects on various cytokine profiles, underscoring its substantial impact on cellular responses and signaling pathways. This impact is particularly pronounced in the secretion of cytokines like VEGFa, MCP1, IL6, IL8, and more, as demonstrated in the graph where we monitored cytokine secretion over time.
These findings underscore the importance of valid in vitro models that can shed light on the intricate cellular responses to hypoxia.



C: Control; H: Hypoxia. All scale bars = 50 µm



2 DAYS 14 DAYS



14 DAYS

future
center for functional tissue reconstruction