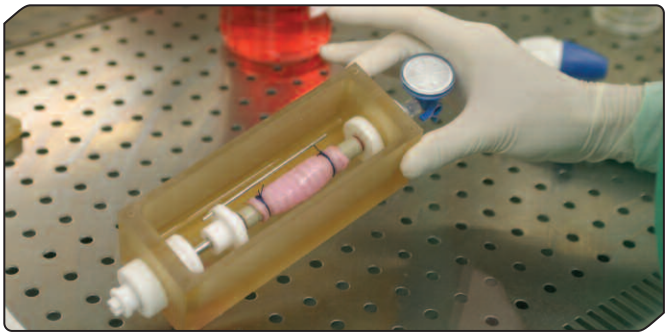
InBreath 3D Bioreactor for Hollow Organs, Bronchus, Trachea & Blood Vessels



KEY FEATURES

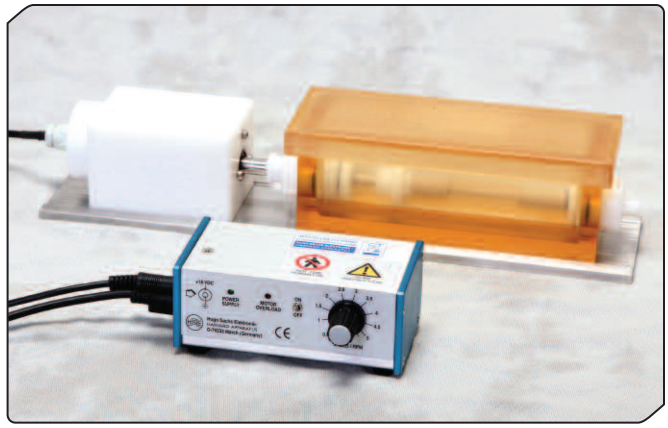
- **Facilitates cell seeding procedures on both sides of a 3D tubular matrix, ensuring homogeneous coverage**
- **Proven Design - demonstrated regeneration of human bronchus and successful human transplantation with positive clinical outcome as recently published by *Macchiarini et al 2008***
- **Allow seeding and culturing of different cell types on either side of the tubular scaffold**
- **Enhance oxygenation of the culture medium and mass transport (oxygen, nutrients and catabolites) between the medium and the adhering cells**
- **Stimulates cells with hydrodynamic forces, favoring metabolic activity and differentiation process**
- **Allows the achievement and maintenance of sterility and other criteria of Good Laboratory Practice (GLP), simplicity and convenience**
- **Permits the possibility of automation and scale-up/-out**

InBreath is a rotating, double-chamber, bioreactor designed for cell seeding and culturing on both surfaces of a tubular matrix and includes rotational movement of the scaffold around its longitudinal axis. A polymeric culture chamber houses the biologic sample and the medium for the whole culture period. Cylindrical scaffold holders are constructed with working ends of different diameters - to house matrices of diverse dimensions - and a central portion of smaller diameter to expose the luminal surface of the matrix for cell seeding and culturing. A co-axial conduit links the inner chamber to the external environment through an interface at the chamber wall. This provides access to seed and feed the luminal surface of the construct. Secondary elements moving with the scaffold holder induce continuous mixing of the culture medium to increase oxygenation and mass transport.

The bioreactor is made up of 3 components: the culture/construct chamber, a DC motor and a control unit. The DC motor turns the spindle in the culture chamber (0-5 rpm adjustable). The control unit is separated from the DC motor by a cable. The control unit sits outside of the incubator allowing researchers to change the speed of rotation without disturbing the incubator. This allows an optimal temperature to be maintained for the cell/matrix construct.

Additionally, the culture chamber and DC motor are connected by a simple spindle. This allows the culture chamber to be removed from the motor as needed (i.e. for sampling, medium exchange, etc.). The DC motor never leaves the incubator. Then the chamber can be placed back into the incubator quickly and easily.

The culture chamber is autoclavability, easy to handle under sterile conditions, reliability and precision ensure the full compatibility of the device with GLP rules.



EASY-TO-USE CONTROLLER

- **Compact design for remote placement (i.e. outside the incubator)**
- **The rotational speed can be controlled from 0 to 5 rotations per minute**
- **Motor overload indicator for safe operation**
- **CE certified**

PURPOSE BUILT REACTOR CHAMBER

- **Reactor container and spindle are made of Polysulphone, Teflon and 316 Stainless Steel allowing for:**
  - **- sterilization**
  - **- chemical inertness**
  - **- biological compatibility**
  - **- transparent for excellent visualization**
- **Chamber has quick-fit spindle for easy removal of the spindle and organ construct for analysis or dissambly**
- **Rotating spindle assures even exposure to nutrient media**
- **Integrated ports on spindle allow access to internal (lumen) surface of organ**
- **Compact dimensions allow placements of multiple units within standard incubator**
- **Offset cover allows for oxygenation of sample by non sheering ambient air contact**
- **Quick release and disassembly of parts makes sterilization easy**

References:

1. Clinical transplantation of a tissue-engineered airway, Macchiarini et al 2008, The Lancet, Volume 372, Issue 9655.

2. A double-chamber rotating bioreactor for the development of tissue-engineered hollow organs: From concept to clinical trial, Asnaghi et al 2009, Biomaterials, Volume 30

Previous
Next
Table of Contents
Search
WWW Home
Contact Us