

hDMT

INSTITUTE FOR
HUMAN ORGAN
AND DISEASE MODEL
TECHNOLOGIES

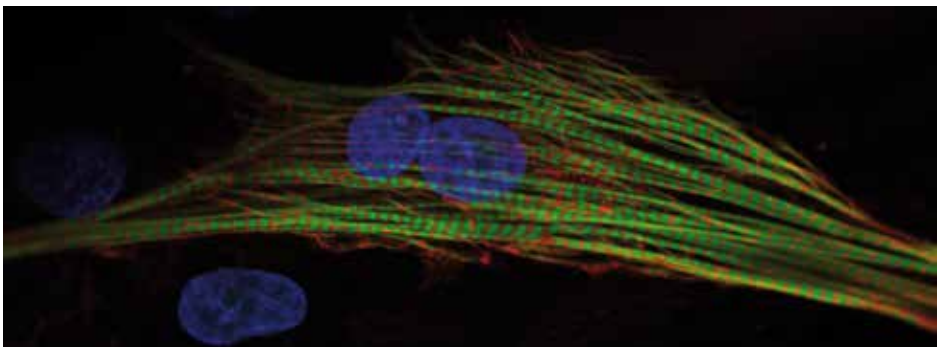
‘Organs-on-chips’ are three-dimensional human living cell cultures that are grown in a dynamic microchip environment. These engineered cell structures mimic the minimal functional units of human healthy and diseased organs and tissues. The chips allow biological, chemical or physical manipulation – and analysis – through microfluidics, mechanical and electrical stimulation, microelectronics, imaging and other high-tech methods.

hDMT is a consortium of renowned scientists with backgrounds in biology, physics, chemistry, pharmacology, medicine and engineering. Our researchers share their knowledge, expertise and facilities to develop organ-on-chip models, by integrating state-of-the-art human stem cell technologies and top level engineering with a wide variety of other expertises.

hDMT is a precompetitive, non-profit technological R&D institute. hDMT’s researchers work at academic research institutions, university medical centers and pharmaceutical companies in the Netherlands, designating hDMT as ‘a laboratory without walls’.

Striated heart muscle cells derived from human stem cells. The blue structures are nuclei. The red and green structures show parts of the contractile apparatus. These cells are used in a microchip for maturation studies by mechanical stretching.

Photo: Berend van Meer (LUMC)



hDMT'S OBJECTIVES

- Develop human organ and disease models that closely mimic healthy and diseased human tissues and organs, through organ-on-chip technology
- Enable valorization and implementation of these models and make them available to interested users for all kind of applications by open access publication

An additional advantage of this technology is the reduction of animal experiments.

APPLICATIONS OF ORGAN AND DISEASE MODELS

- Drug target discovery and screening
- Drug toxicity screening
- Development of personalized diagnostic tests and treatments
- Testing of non-medical compounds, such as food additives, environmental contaminants or cosmetics

CURRENT RESEARCH PROGRAMS

Themes

- Brain-on-chip
- Cancer-on-chip
- Heart-on-chip
- Vessels-on-chip

Research lines

- Human organ and disease models
- Organ-on-chip technology platforms

FOUNDING PARTNERS

- Delft University of Technology
 - Eindhoven University of Technology
 - Erasmus University Medical Center
 - Genmab
 - Galapagos BV
 - Hubrecht Institute
 - Leiden University
 - Leiden University Medical Center
 - University of Twente
- And more partners to come...

INFORMATION

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development, validation & implementation
lifestyle & nutrition
stem cell technology
organ-on-chip technology
hDMT no animal experiments
personalized medicine
micro & nanotechnology
human organ & disease models multidisciplinary consortium



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Coverphoto: Transparent organ-on-chip device made of polydimethylsiloxane (PDMS). Two crossing microchannels (blue and black) for liquid transport are separated by a porous membrane (opaque triangle) on both sides of which cells can be cultured. Device: Hossein Amirabadi (TU/e); Photo: Jaap den Toonder (TU/e)