The Torch
Vol. 2 (18)

Studying diseases using organ-on-a-chip

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To study the relationship between different organs and immune systems, organ-on-a-chip models have been developed, which create an artificial environment allowing the researchers to conduct all kinds of tests on a specific organ or organ system. This also allows the researchers to decrease or increase the level of disease in a systematic and controlled condition. Construction of synthetic organs for testing of drug response or any other phenomenon requires thorough knowledge and understanding of the human body and its response to said stimuli. Presently, researchers are working on micro-physiological systems (MSPs), which are small-scale replicas of multiple interconnected organs, this would allow the user to study interactions with up to 10 organs at a time. According to the researchers, diseases that involve multiple organs or are influenced by the immune system or which do not depend on a single gene can be analysed in these devices. Diseases related to colon malfunctioning, such as ulcerative colitis are generally related to the liver and vice versa. Organ-on-a-chip provides a platform for scientists to study these diseases without using animal models. Another important sector where this organ-on-a-chip has enormous demand would be neurological disorders. To study diseases, such as Parkinson’s, Alzheimer’s, and many more we tend to introduce the disease in mice as their brain chemistry is more similar to humans and go forward in drug development. But to get precise results, we require many mice, which is a lengthy process and raises ethical issues. This technology would be able to provide a better way for the development of cure against such diseases; such devices are also called brain-on-a-chip because they tend to provide an interface between microfluidics and neuroscience.

Keywords: Artificial organs, Tissue engineering, Animal model alternatives, Regenerative medicine

Citation:
Ketki Potekar. Studying diseases using organ-on-a-chip. The Torch. 2021. 2(18). Available from:
https://www.styvalley.com/pub/magazines/torch/read/studying-diseases-using-organ-on-a-chip.