

Application of Organ-on-a-Chip Systems in Precision Medicine

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Personalized medicine is broadly defined as the use of information from a patient's genotype to either initiate a preventative measure against the development of a disease or the ability to select the most appropriate therapy that is particularly suited to a patient. Despite the benefits of using DNA based personalized diagnostic approaches, in many cases the underlying genetic risk factors are too many to reliably predict cellular responses to drug treatments. To overcome this challenge, next generation personalized diagnostic tools also need to make use of information obtained from living cell assemblies that resemble the (patho)physiological microenvironment of individual patients to accurately predict disease onset, progression and remission. In course of the presentation current state-of-the-art of personalized diagnostics will be reviewed and three different organ-on-a-chip applications in precision medicine introduced including cancer drug screening, chronic inflammation research and neurodegenerative diseases.