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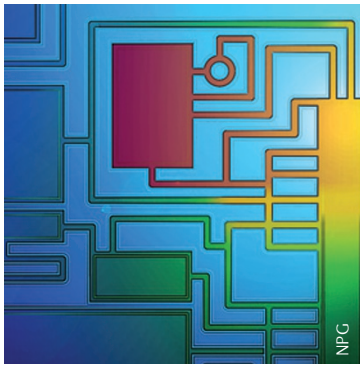

Microfluidics in drug discovery p620

Inflammation is an essential, beneficial host response to infection or injury, but if it is chronic it can induce or exacerbate various human diseases. The inflammatory process is mediated in part by pro-inflammatory cytokines, several of which have become established targets for therapeutic intervention. In their Review, Dinarello and colleagues focus on interleukin-1 (IL-1), providing an overview of its role in disease and outlining current and emerging approaches for IL-1 neutralization. Clinical trials of IL-1-targeted agents in conditions ranging from classic autoinflammatory syndromes to arthritis, heart failure and stroke, as well as potential future indications, are discussed. Metabolic disorders including diabetes, dyslipidaemia and obesity are among those diseases in which inflammation has a pathological role. Recently, several metabolite-sensing G protein-coupled receptors (GPCRs) involved in the coordination of metabolic processes and the mediation of immune cell inflammatory signalling have been identified. Offermanns and colleagues review the expression, signalling and function of these GPCRs and discuss the emerging pharmacological agents that are being developed to target them for the treatment of metabolic disorders. In our final Review, Manz and colleagues discuss advances in the use of microfluidics (lab-on-a-chip) technology in drug discovery, which — by miniaturizing assays — aims to increase experimental throughput. Focusing on recently developed microfluidic techniques, they review biological applications that are relevant to drug development, including the study of enzyme activity and drug–protein interactions. Microfluidic approaches to model systems for disease or toxicity studies are discussed, including examples of tissue culture techniques, 'organs on a chip' and 'organisms on a chip', which may help to expedite early stages of drug discovery and reduce reliance on animal testing.

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