

statistical manner as hundreds and thousands of cells could be profiled individually for their physiological and pharmacological responses. Furthermore, individual cells of interest could be pre-selected, such as specific density of receptor markers, appropriate combination of receptor/ion channel systems, and particular pathogenic or phenotypic states. One could also envision the potential to place specific types of cells that detect complex environmental factors to these devices like, for example, those that sense taste, smell and sound.

Importance of location

Other areas of study that could be enhanced by cellular positioning are subcellular organization and microdomain measurements. Furthermore, subcellular positioning of receptors could be examined as cells are positioned in specific locations. Nature has already shown us the impact of specialized subcellular structures such as the neuromuscular junction and cell contacts and communication. Although the positioning of cells on substrates and microfluidic recording systems could impact the utility of these positioning and recording technologies, by combining recent progress in ion channel clustering and trafficking systems, it might be possible to engineer cells expressing recombinant ion channels or receptors with appropriate scaffolding proteins to achieve both positioned and timed surface expression.

Another potential application of cellular positioning is to measure events in microdomains in the intact cell. There are significant advantages of applying imaging and other detection technologies when the cell subject is positioned in a precise location. This type of device could permit examining, for example, enzymatic activity, pH and calcium levels in a given subcellular microdomain on thousands of cells.

Location might hold the key! Continual improvement and integration of a variety of scientific disciplines, including material sciences, silicon device fabrication techniques, microelectronics, medical technology and cell biology, physiology and pharmacology will continue to significantly impact on this area of scientific discovery.

Reference

- 1 Straub, B. *et al.* (2001) Recombinant maxi-K channels on transistor, a prototype of iono-electronic interfacing. *Nat. Biotechnol.* 19, 121–124

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Drug discoverers – you need us! – Reply ▲

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Response from Frank King

Professor Federsel raises two interesting points: the status of Process R&D as a state-of-the-art technology and a greater involvement of Process R&D in the drug candidate selection process. From my own perspective as a medicinal chemist who has worked in the industry for nearly 24 years, I wholeheartedly support Prof. Federsel's assertions. Process R&D has come a long way from simply producing kilogram quantities of known compounds (if it was ever as simple as that!). As Prof. Federsel points out, speed-to-market is vital for the commercial viability of drugs, especially in areas where there is high

competitiveness for first-to-market. In addition, efficient synthesis to reduce cost of goods, product lifetime extensions and environmentally friendly synthetic procedures are all-important factors in the modern pharmaceutical industry.

The second point Prof. Federsel makes about greater involvement of Process R&D in the candidate drug selection process is an extension of what we term the 'developability' concept. Driven by a need to reduce failure rates and thus improve the probability of success, the more enlightened pharmaceutical companies have removed the research/development interface. This has enabled ADME and toxicology to be increasingly applied early in the research phase so that the candidate with the highest probability of success is identified. Thus, the candidate selected might not be the most potent compound, nor the one with the best *in vivo* activity, but the one with the best overall profile for rapid and successful development. The inclusion of Process R&D early in candidate selection can only improve decision-making.

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One-third of Swedish food plants has anti-inflammatory records ▼

One-third of Swedish food plants has anti-inflammatory records. It is commonly known among patients with rheumatoid arthritis that meat products will worsen their clinical symptoms. These patients therefore try a lacto-vegetarian diet, often with positive results^{1,2}. Several clinical studies on the relieving effect of a vegetarian diet on rheumatic pains have been published,