Microarray patches for transdermal drug delivery and diagnostic approaches

The skin is one of the most powerful barriers in the human body, protecting it from an immense number of external aggressors and pathogens. However, this barrier is also responsible for blocking the permeation of the majority of drugs through skin, which could otherwise be extensively used as a common drug administration route. The *stratum corneum* (SC), which is the most external layer of the skin, is majorly responsible for this barrier function, so any drug administered to the skin must overcome this layer as well as the epidermis before reaching the rich capillary network in the dermis. Due to its composition and structure, the SC only allows the penetration of drugs with very specific characteristics, including low molecular weight, adequate hydrophilicity/hydrophobicity balance and low melting point. To overcome these limitations, researchers have focused efforts in developing transdermal delivery strategies that somehow disrupt the SC barrier, including microarray patches (MAPs).

MAPs are minimally invasive devices containing 50-900 μm long projections, in various shapes and geometries, and manufactured from a variety of materials including ceramics, metals and biocompatible polymers. One of the most interesting features of these devices is the possibility to deliver high doses of drugs, in a controlled and sustained manner, without causing any pain or bleeding. These patches can also be used for other applications such as drug monitoring and diagnostics, through the minimally invasive and painless collection of interstitial skin fluid. Altogether, this technology has shown promising results in different areas of application which may lead to significant impact in the lives of patients across the world.

Short Bio:

Sara Cordeiro is a Senior Lecturer in Pharmaceutical Sciences at the School of Pharmacy at De Montfort University (Leicester, UK). Following a PharmD from the University of Porto (Portugal) and a PhD in Drug Research and Development from the University of Santiago de Compostela (Spain), she worked as a Postdoctoral Research Fellow at Queen's University Belfast (Belfast, UK). Throughout these years, Sara has developed a background in pharmaceutical formulation, drug delivery, nanomedicine, vaccine delivery and microneedles for transdermal drug delivery and diagnostics. Currently, she is establishing her independent research group with a focus on improving and facilitating patients' lives through the development of drug and vaccine delivery systems that are easy to manufacture and scale-up, highly efficient and administered through non-invasive routes.