

## Engineered materials for tissue engineering and as a tool to help understand mechanotransduction

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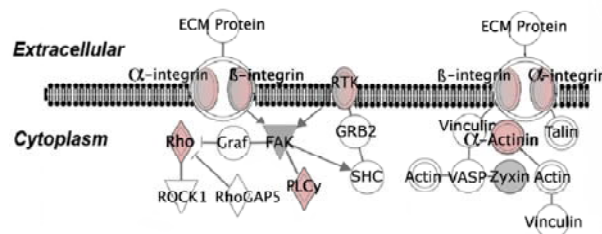
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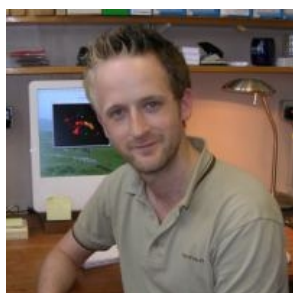
### Abstract

Through the modification of the cell material interface at the nanolevel, marked changes in mesenchymal stem cell fate can be achieved and some examples will be discussed with regard to differentiation and self-renewal. It will be postulated that biochemical pathways initiated by changes in morphology and direct mechanotransduction with the cells acting as a percolation networks are involved. The group have used histological, genomic and proteomic techniques to study the basic science of stem cell response to nanomaterials and also consider how to apply these materials to regenerative medicine.



*FIGURE: Up-regulation of integrin signalling in response to nanodepth grooves.*

## Biography



Matthew Dalby is a lecturer in Cell Engineering. After completing a PhD at the IRC in Biomedical Materials (thesis 2001), MD moved to Glasgow to join Profs Curtis and Wilkinson as a PDRA. In 2003 he was awarded a BBSRC David Phillips Fellowship to explore stem cell differentiation and mechanotransduction on nanotopography. He is now a lecturer in Cell Engineering within the Faculty of Biomedical and Life Sciences. In addition to his fellowship, he has secured follow-on funding from BBSRC to investigate commercialisation of ideas coming from his fellowship in collaboration with Dr Nikolaj Gadegaard and Prof Richard Oreffo. He has also secured research grants from BBSRC, EPSRC, the AO Foundation and the Chief Scientists Office. These projects cover research from basic cell biology (adhesions and mechanotransduction) to biomaterials and tissue engineering. With consultant orthopaedic surgeon Mr Dominic Meek, he is establishing the Glasgow Orthopaedic Research Initiative (GLORI) as a nexus between lab and clinic. He was also part of a team who obtained Royal Society / Wolfson funding for refurbishment of the Centre for Cell Engineering. He has published over 60 papers, including in Nature Materials, 2 patents and has been cited over 1500 times. He has won 10 awards including the Tissue and Cell Engineering Society Early Stage Investigator Award (2006), Society for Experimental Biology President's Medal (2007) and Nexus West of Scotland Young Bioscientist of the Year (2007). He is part of the Centre for Cell Engineering with Drs Riehle, Berry and Gadegaard.