

Understanding the mechanics of cells to provide new medical insights

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University of Southampton researchers are at the forefront of research into mechanobiology, an emerging field of science combining biology and engineering, which investigates the influence of mechanical forces on cellular and molecular processes.

Mechanobiology has a large potential to bring new insights into physiological function, aetiology (the study of the causes of diseases) and prevention of chronic diseases including [heart failure](#), cancer, osteoporosis and neuromuscular disorders. It could also contribute to the development of effective regenerative therapies and ultimately, lead to innovations in biomedicine and biotechnology in the coming years.

Cells reside in mechanically rich and dynamic microenvironments and the complex relationship between mechanics and biology provide cells with the ability to sense and respond to this microenvironment.

Understanding the behaviour of cells from a mechanical viewpoint and the relationship between mechanical deformation and biological response offers an opportunity for halting [disease mechanisms](#), differentiating [stem cells](#) and remodelling of engineered and regenerated tissues.

Southampton researchers are conducting computational research into cell mechanics and mechanobiology, which is providing new insights not previously available.

Dr Georges Limbert, from the national Centre for Advanced Tribology at Southampton (nCATS), is conducting research that focusses on the modelling of the mechanobiology of biological [soft tissues](#) and the physical behaviour of biomaterials. Dr Limbert says: "The multidisciplinary combination of computational simulation and experimental approaches allows exploring phenomena in cell mechanics that are not easily accessible with experimental methods alone. This also offers the potential to accelerate the development of practical solutions in [regenerative medicine](#)."

Southampton researchers will present their current work next week to an international audience at the International Workshop on Cell Mechanics and Mechanobiology, taking place on 9 and 10 September in Cape Town, South Africa. This two-day workshop, organised by researchers from the universities of Southampton and Cape Town, will offer lectures from international experts from academia and industry on experimental and computational research in cell mechanics and mechanobiology and its application to [chronic diseases](#).

The event is funded from the Global Partnership Fund programme of the UK Department of Business, Innovation and Skills that aims to promote UK international collaborations in research and innovation. Part of the workshop involves consortium meetings to develop research and innovation proposals and includes a meeting with the UK Minister of State for Universities and Science, Rt Hon David Willets MP.

Provided by University of Southampton

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