A new understanding of everyday cellular processes

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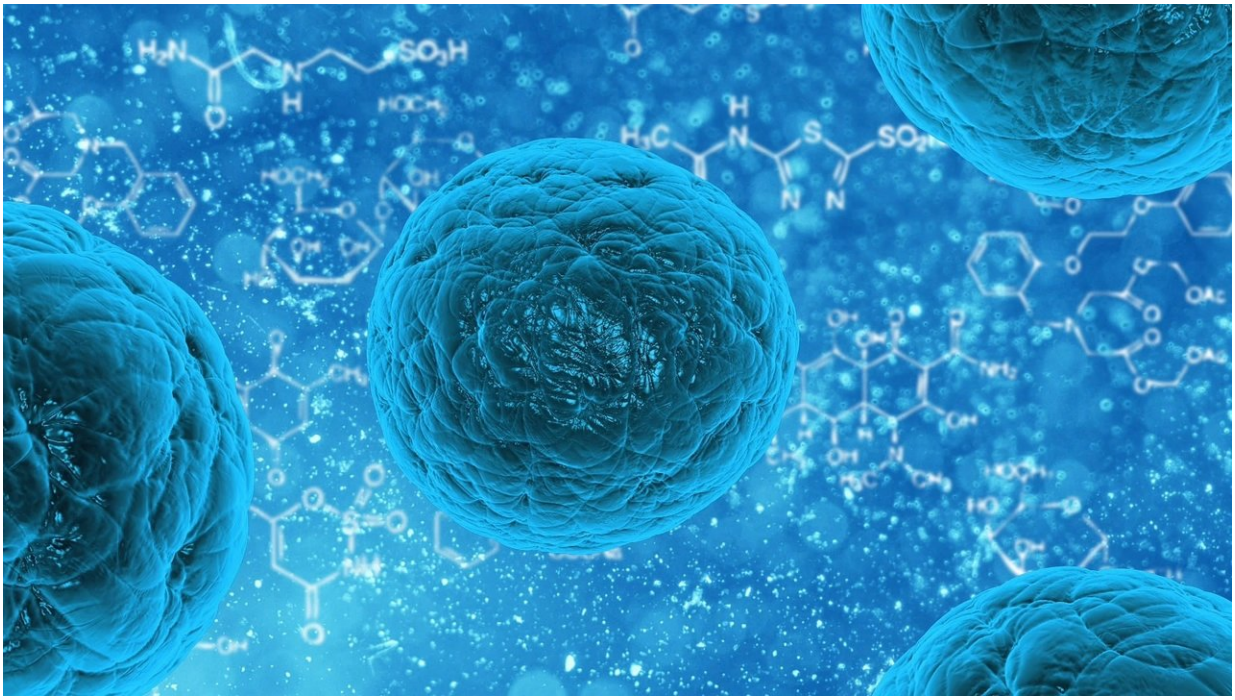

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We use cells to breathe, to moderate body temperature, to grow and many other every day processes, however the cells in these processes are so complex its left scientists perplexed into how they develop in different environments. Researchers from the University of Warwick say future research needs to look into the bioelectrical composition of cells for answers.

Cellular processes happen every day for survival, form homeostasis to photosynthesis and anaerobic respiration to aerobic respiration. However the complexity of cells has fascinated and challenged human understanding for centuries.

It's cellular "machinery" responsible for key functions have been the focus of biology research, and despite previous research exploring the molecular and genetic basis of these processes showing unprecedented insights, we still can't fully understand and predict cell behaviour when challenged to different conditions.

In particular, the basis of heterogeneity in single-cell behaviour and the initiation of many different metabolic, transcriptional or mechanical responses to environmental stimuli remain largely unexplained.

Researchers from the School of Life Sciences at the University of Warwick have today, the 20th May had the paper "Bioelectrical understanding and engineering of cell biology," published in the *Journal of The Royal Society Interface*, in which they have gone beyond the status quo of understanding cell behaviours, and argue a combination of genetics, physics and physiology can be grounded on a bioelectrical conceptualisation of cells.

They argue that a bioelectrical view can provide predictive biological understanding, which can open up novel ways to control cell behaviours by electrical and electrochemical means, setting the stage for the emergence of bioelectrical engineering.

Dr. Orkun Soyer, from the School of Life Sciences at the University of Warwick comments:

"When looking at the underlying chemistry of this "machinery" it is easy to recognise the importance of electricity in biological phenomena.

"Here we advocate that the understanding of cells as electrical entities will pave the way to fully understand, predict and modulate cellular function. When cellular functions are understood it could have a huge impact on healthcare, as conditions related to, for example, homeostasis such as heart failure or diabetes, could have new treatments researched if we can manipulate the bioelectricity in the cells."

More information: Zoe Schofield et al. Bioelectrical understanding and engineering of cell biology, *Journal of The Royal Society Interface* (2020). DOI: 10.1098/rsif.2020.0013

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