

Power, Sex, Suicide: Mitochondria and the Meaning of Life

By Nick Lane

Reviewed by Sølve Tegnér Stenmark, Malakoff Upper Secondary School, Moss, Norway

Power, Sex, Suicide: three words that immediately aroused my interest in reading this book. The subtitle, *Mitochondria and the Meaning of Life*, explains what the book is about – the crucial role of mitochondria in our lives.

This book is not appropriate for young students just starting to study biology, but for higher-level students and their teachers, it is fascinating. I would recommend it for all students, teachers and others who are interested in questions like: How did life evolve? Why do we have sex and two sexes? Why and how do we age?

For those who studied biology some decades ago, or who are searching for new insights into the meaning of life, this book is full of recent scientific research and some speculative, but plausible, conclusions about the story of life. A useful glossary will help the reader to understand biological terminology.

The author's main theme is that the endosymbiotic event that took place 2 billion years ago is the most important event in the evolution of life. Mitochondria were originally a kind of bacteria living independent lives. Endosymbiosis, a process in which mitochondria were engulfed by larger cells and became organelles inside those cells, then enabled the develop-

ment of multicellular and more complex organisms. Without this remarkable event, no eukaryotes or more complex life forms would have evolved. Without mitochondria, the world as we know it would not exist.

Nick Lane begins his book by discussing the origin of life and the origin of the eukaryotic cell. Then we are taken to the world of bacteria and Archaea. Why have bacteria remained resolutely bacteria for millions of years, while an unusual union between a bacterium and an archaeon created the eukaryotic cell? The 'power' described in the book's title comes from the mitochondria themselves, as Lane describes in detail how they synthesize ATP through the electron-transport chain and oxidation/reduction.

Lane then deals with why sex arose and the origin of the two genders. When two cells fuse at fertilisation, there is competition between the two sets of mitochondrial DNA to populate the new individual.

Mitochondrial DNA is inherited asexually down the maternal line, and the author suggests that this is the origin of the two genders.

The culmination of the book is the discussion on ageing and the 'clock of life'. Given the higher mutation rate in mitochondrial DNA than in nuclear

DNA, the author suggests that mitochondrial mutations contribute to ageing and disease, and that apoptosis (cell suicide) is necessary to dispose of damaged cells. Most importantly, degenerative diseases could be slowed down by slowing down the rate of free-radical leakage from the mitochondria.

This is a wonderful book not only for learning more about mitochondria, but also for addressing important questions: Who are we? Why are we here on earth? Why do we have sex? Why are there two sexes? Why do we fall in love and have children? And why must we grow old and die? This enlightening book provides a good starting point for fruitful discussions of all these questions.

Details

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