THE ZELMAN COWEN ACADEMIC INITIATIVES PRIZE

For Discovery In Medical Research

The Hebrew University Of Jerusalem
BOARD OF GOVERNORS 2023
SUSTAINABLE PLANET
JUNE 2023

ZCAI HISTORY

THE INTIATIVES

The Zelman Cowen Academic Initiatives was established in 2021, to continue the work of the Sir Zelman Cowen Universities Fund. Working with the Sydney-based group Education Heritage Foundation, it advises on academic initiatives to support Australian universities and the Hebrew University of Jerusalem. Since 1978 the SZCUF donated millions of dollars for the support of medical research, and the ZCAI will work to continue that tradition. The SZCUF also established a tradition of support for academic and students exchanges between Australia and the HUJI, and the ZCAI will work to continue this tradition , as well. Exchanges will be supported in any discipline, not just medical research. The ZCAI will also continue the Prize for Discovery in Medical Research established by the SZCUF; indeed, the value of the Prize has been recently increased.

ZCAI HISTORY

THE PRIZE

The Zelman Cowen Academic Initiatives Prize for Discovery for Medical Research

Awarded in alternate years at the Hebrew University and at an Australian institution.

It comprises an award of AUD$25,000. it is awarded for a discovery which has made a major contribution to the understanding or treatment of disease and has achieved or has potential to achieve therapeutic outcomes.

The prize was established in November 2004 in honor of the Fund's patron, Sir Zelman Cowen who served as Governor General of Australia from 1977-1982. It was established by a special donation from the Hammond Trust.

BOARD OF DIRECTORS

MR. MICHAEL DUNKEL

Mr Dunkel is a Sydney solicitor. He holds a law degree from Sydney University and until 2013 was the managing partner of a law firm that he founded. He has had a long relationship with the Hebrew University of Jerusalem. Mr Dunkel currently serves as President of the Australian Friends of the Hebrew University, having previously held the role for the New South Wales branch. Mr Dunkel is also a member of the University's Board of Governors and its Executive Committee. He is also a Governor of the Orion Foundation, which he helped establish to fund projects including the Orion Center for the Study of the Dead Sea Scrolls. Mr Dunkel is an Honorary Fellow of the Hebrew University of Jerusalem and was also awarded an Honorary Doctorate in recognition of his services.

PROFESSOR JONATHAN STONE

Professor Stone, now Emeritus with the University of Sydney, served as Managing Trustee of the Sir Zelman Cowen Universities Fund for 25 years. He is a Fellow of the Australian Academy of Sciences.

MR. ROBERT SIMONS OAM

Mr Simons has acted a Trustee of the SZCUF for over 20 years. He has had a significant and long-term association with the Hebrew University of Jerusalem and was the first Australian associate to be invited to join the Hebrew University's Executive Committee. Over a period of 26 years, Mr Simons has held multiple roles for the Hebrew University, including President of both the Australian and NSW Friends of the Hebrew University, and as a member of the Board of Governors and its Executive Committee. He was granted a degree of Doctor Philosophiae Honoris Causa PhD by the University in recognition of his enormous contribution. Mr Simons was also awarded an OAM for his contribution to education and his work with the Jewish community.

PROFESSOR DAVID CELERMAJER AO

Professor Celermajer is the Scandrett Professor of Cardiology at The University of Sydney and Director of Echocardiography at Royal Prince Alfred Hospital. He is also the Clinical Director of the Heart Research Institute, sits on the National Heart Foundation of Australia's Cardiovascular Health Advisory Committee, and serves as a Board Member of the Menzies School of Health Research. Professor Celermajer was appointed as an Officer of the Order of Australia (AO) for his services as a researcher and clinician in the field of cardiovascular disease.

2023 WINNER

Cadia Levy

DR. YANIV ELKOUBY

THE SCHOOL OF MEDICINE

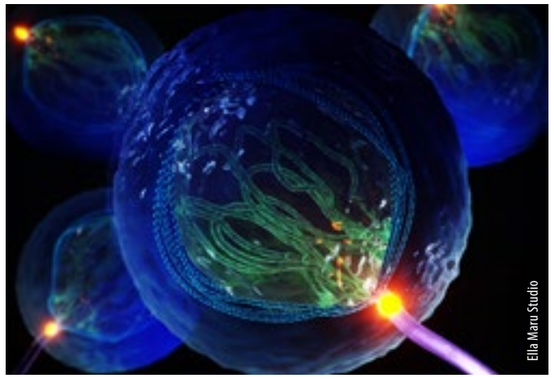
Dr. Yaniv Elkouby is a faculty member at the School of Medicine at the Hebrew University of Jerusalem. He received his PhD in embryogenesis and developmental biology from the Technion–Israel Institute of Technology in 2010. During his postdoctoral research at the Perelman School of Medicine at the University of Pennsylvania, Dr. Elkouby established a new model system to study the cellular mechanisms of ovary development and early egg production. His research employs a multidisciplinary approach to the developing ovary, and he pioneered the view of egg production by advanced quantitative and live microscopy of whole ovaries. His research resulted in several breakthroughs that contribute to our understanding of the earliest stages of egg production, generating knowledge that is directly relevant to human reproduction. He has won numerous grants and awards, including prizes for excellence in research, HUJI President and Rector Awards for Outstanding Publications, an ERC Consolidator grant, and the EMBO Young Investigator Award. Dr. Elkouby has four children, and he enjoys travelling and scuba diving.

RESEARCH DESCRIPTION

Newly identified structure in developing egg and sperm cells leads to better understanding of human infertility

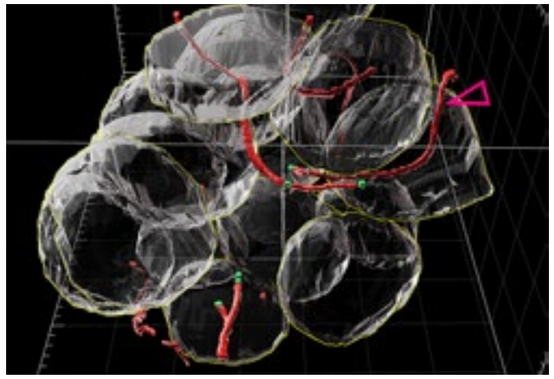
The production of eggs, called oogenesis, is a fascinating and dynamic process, essential for embryonic development, fertility, reproduction, and women's health. In humans, early oogenesis in the developing fetus determines by birth the number and quality of eggs for a person's entire lifespan. Moreover, defects in early oocyte (early developing egg cells) and ovarian development are a leading cause for miscarriages and infertility, as well as reproductive syndromes and malignancies. The mechanistic defects, however, are unknown because we lack a fundamental understanding of these early processes. The overarching question studied in the Elkouby lab is how eggs are produced—focusing on open questions in early oogenesis, from the germline stem cell to the primary follicle. Developing eggs and sperm must accurately organize their chromosomes for successful fertilization in a cellular program called meiosis. The Elkouby lab discovered a previously unknown organelle—the zygotene cilium—which forms in eggs and sperm, looks like a twisted fiber, and acts as a molecular cable system to mechanically control chromosomes in meiosis. During meiosis, microtubules emanate from the centrosome to cluster telomeres in the bouquet configuration and facilitate chromosome pairing. Using genetic analyses and advanced microscopy in living ovaries, the lab discovered that the zygotene cilium in zebrafish anchors the centrosome and is important for telomere clustering and germ cell development. Moreover, the zygotene cilia are essential for egg development. In their absence, egg cells died, ovaries did not develop, and females were infertile. Remarkably, the lab showed that the cilium is evolutionary conserved in mammals—and is thus very likely conserved in humans as well. This groundbreaking discovery can lead to better understanding of human fertility.

The discovery of the zygotene cilium in eggs and sperm enables a substantial leap forward, and the lab continues to decipher principles and mechanisms of the zygotene cilium in females, males, and in infertility. The zygotene cilium establishes a new subfield of research, and novel platforms for identifying entirely overlooked mechanisms toward transformative medicine

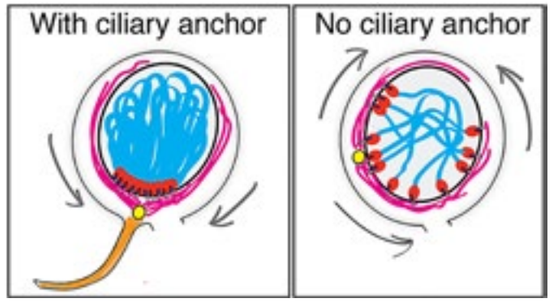


Ella Maru Studio

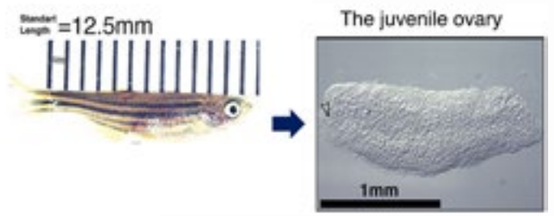
A developing oocyte measuring a fifth of the width of a human hair. The chromosomes (in green) are organized by the pulling of their ends by a cable system machinery within the cell (blue cables and yellow circle). The Elkouby lab discovered that the cilium (purple filament) connects to this machinery and anchors it to counterbalance chromosome pulling—forming an essential force to enable accurate execution of meiosis..



Segmentation of three-dimensional real image of the cilium in a group of developing oocytes within ovaries. The nuclei of developing oocytes in this group are shown in grey, and the zygotene cilium (brown) grows from the centrosome (green) and extends between them.



demonstrating chromosomal organization in egg cells during normal development (left), and their perturbation upon ciliary loss (right). In normal development the cilium (orange) anchors the centrosome (yellow) from which microtubules (magenta) extend around the nucleus (inner lack circle). Telomeres (red) at the end of chromosomes (blue) associate with microtubules and are pulled toward the centrosome. This is essential for meiosis. Without the ciliary anchor, the centrosome collapses towards the nucleus, telomeres fail to cluster, and egg cells die



The zebrafish and the developing ovary: The zebrafish (a juvenile zebrafish is shown at left) is an excellent animal model for human biology, sharing >70% of their genome with humans and modelling >80% of human genetic diseases. Among many other experimental advantages, the zebrafish developing ovary (right) is flat and transparent, which is ideal for microscopy. It contains numerous developing egg cells, called oocytes (little circles depicted by the arrowhead). Scale bars are 1 mm.

A. Mytlis*, V. Kumar*, T. Qiu, R. Deis, N. Hart, K. Levy, M. Masek, A. Shawahny, A. Ahmad, H. Eitan, F. Nather, S. Adar-Levor, R. Y. Birnbaum, N. Elia, R. Bachmann-Gagescu, S. Roy, Y. M. Elkouby. Control of meiotic chromosomal bouquet and germ cell morphogenesis by the zygotene cilium. Science, vol. 376, no. 6599, eabh3104 (2022).

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June 2023

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