

News Release

Novel approach for treating mitochondrial disorders wins Kaye prize for Hebrew University graduate student

Jerusalem, June 29, 2008 – A novel concept for the treatment of mitochondrial disorders using directed enzyme replacement therapy (DERT) has won for a Hebrew University of Jerusalem doctoral candidate one of this year's Kaye Innovation Awards. The awards were presented at this year's 71st meeting of the Hebrew University Board of Governors.

DERT is a therapeutic approach to metabolic disorders whereby the deficient or absent enzyme is artificially manufactured with the addition of a delivery component and is administered to patients on a regular basis.

Mitochondria are special little organelles within the cells (organelles are small, unique structures within the cells that perform specialized tasks). The mitochondria play a critical role - most of the numerous biochemical pathways and reactions are performed within them. However, their most important job is to generate energy out of food and to discard toxic metabolites. (Metabolites are substances produced by a metabolic reaction.)

Inside the mitochondria there are thousands of enzymes that carry out all these reactions. If one of these enzymes is damaged or deficient due to a genetic mutation, a mitochondrial metabolic disorder occurs. Modern medicine offers no cure for mitochondrial disorders (among which are mitochondrial myopathies, maple syrup urine disease and many others). The standard treatment is only palliative, with the aim of improving, postponing or circumventing the massive damage caused by the over- production of free radicals, the accumulation of toxic metabolites and the low rate of energy production.

Matan Rapoport, a Ph.D. student in the Department of Cellular Biochemistry and Human Genetics at the Hebrew University Faculty of Medicine, demonstrated the effectiveness of DERT by treating the mitochondrial disorder lipoamide dehydrogenase (LAD) deficiency. LAD deficiency is an inherited recessive disorder, which results in extensive metabolic disturbances due to a reduction in the activity of the LAD enzyme within the mitochondria.

The clinical course of LAD deficiency is variable, presenting in infancy as a neurological disease of varying severity, or later in life with life-threatening recurrent episodes of liver failure. Most LAD deficiency patients suffer from neurological symptoms.

In developing DERT, Rapoport proposed a novel but simple approach for the delivery of an artificial mitochondrial enzyme directly to its sub-cellular location. The approach is to fuse the manufactured LAD enzyme with a specific delivery component, which will then lead the LAD into the cells and their mitochondria. There, it will substitute for the mutated endogenous enzyme.

For the past four years, Rapoport, under the guidance of Hebrew University Prof. Haya Loberboum-Galski, has been experimenting in vitro on cells taken from patients suffering from LAD deficiency. The results have been highly positive. Experiments are also now being conducted on the in-vivo model of this disorder in LAD-deficient mice. Very promising preliminary results show the ability of this therapy to improve LAD enzymatic activity even in the mouse brain.

Rapoport's invention of enzyme replacement therapy for mitochondrial disorders is patented by Yissum, the Technology Transfer Company of the Hebrew University of Jerusalem. This invention possesses great potential to becoming the treatment of choice for various types of mitochondrial disorders and consequently encompasses a significant commercial potential, as today there is no known medical cure.

The Kaye Innovation Awards, one of which went to Rapoport, have been given annually since 1994. Isaac Kaye of England, a prominent industrialist in the pharmaceutical industry, established the awards to encourage faculty, staff and students of the Hebrew University to develop innovative methods and inventions with good commercial potential which will benefit the university and society.

For more information, or for press contact with students, faculty or spokespersons from HU, please speak in the first instance to Mikki Saperia, on +44 (0)20 7691 1479 or email mikki.saperia@bfhu.org.



About the Hebrew University

With 24,000 full-time students, the Hebrew University of Jerusalem is Israel's pre-eminent institute of higher education. Its faculty members pursue projects that are both essential to Israel's future and the benefit of humanity. It is a centre of international repute, with formal and informal ties extending to and from the worldwide scientific and academic community. Students come from all over Israel and across the Middle East to study in an atmosphere of academic and research excellence.

About the British Friends of the Hebrew University

Established in 1926, The British Friends of the Hebrew University is the oldest established Jewish charity in support of higher education. The charity works to promote and enhance the reputation of the Hebrew University, ensure that underprivileged students are given the opportunity to complete their studies, and help HU to maintain its standard of excellence and worldwide reputation for research.

BFHU acts as the UK's gateway to Hebrew University research, expertise and faculty, and provides financial and pastoral support for prospective and current students at HU, as well as supporting visiting and sabbatical Hebrew University lecturers during their time in the UK.