

Institute of Evolution – המכון לאבולוציה

Bioinformatics Post-Doc Positions-Evolution Institute, Haifa University, Haifa, Israel

We are looking for **independent**, motivated, diligent, dedicated with good analytical skills, Post-Doctorates in **Bioinformatics**, for a project aimed at revealing the mechanisms of cancer-resistance and anti-cancer activity of the hypoxia-tolerant (down to 3% O2), long lived (>20 years) subterranean, blind mole-rat, *Spalax*. Candidates should have a good background in biology. Specifically, candidates in Bioinformatics should be able to process large scale genomic data, such as raw RNA-seq, miR seq and Genomic sequencing, analyze the data, and biologically interpret it in high level. Accordingly, background in statistics, programming and scripting is required (e.g., experience and knowledge in tools like Linux clusters, R, mysql, Matlab, perl, python, etc.).

Background in cancer research and familiarity with TCGA [TheCancerGenomeAtlas] is an advantage but is not a precondition.

Experience of writing manuscripts for publication and a proven publication record, including

1st authorship publications, in relevant peer-reviewed international journals with respected impact factor are expected. English skills both oral and written are required.

Our project has captured the interest of the scientific community and we have ample financial support for the studies and can offer generous fellowships (\$30K to \$40K according to performance).

The positions are open for 3 years. We expect that candidates will commit themselves for at least 2 years with a willingness to extend the period of their studies according to the needs of their project.

(Outstanding MSc graduates for PhD studies in Bioinformatics will also be considered.)

SCIENTIFIC BACKGROUND: We are working with the hypoxia-tolerant (down to 3% O2), longlived (>20 years) subterranean blind mole-rat, *Spalax*, which shows an outstanding cancer-resistance and anti-cancer capabilities. Observations of thousands of individuals at our Institute have never noticed a spontaneous malignant tumor. Furthermore, we have found in Spalax different structure and function of major genes related to cancer (p53, heparanase, genes of antioxidant defense and DNA-repair genes). Assessment of Spalax transcriptome assembly and expression data has revealed enrichment of genes that overlap cancer resistance, apoptosis, angiogenesis, and hypoxia-tolerance and elicits much wider and stronger expression in Spalax than in rat (Malik et al, 2012, BMC genomics, 13, 615). Moreover, Spalax has shown extremely high cancer-resistance to chemical carcinogens that induced cancer in 100% of mice and rats. Most intriguing, fibroblast cells only from Spalax, but not from other species, inhibit growth and kill cancer cells, but not normal cells, from various tissues and species, most importantly a wide range of human cancer cells. This is exhibited in both co-culture system or by exposure to factors secreted into conditioned media harvested from *Spalax* fibroblasts. Decreased cancer cell viability and proliferation, reduced colony formation in soft agar, disturbed cell cycle progression, chromatin condensation, nuclei deformation and mitochondrial fragmentation were reproducibly observed (Manov et al., 2013, BMC biology 11, 91). Our present objectives is to identify and isolate the substances secreted by Spalax cells, resolve with which components they interact that are active only on cancer cells, in order to unravel the biological mechanisms and pathways that evolved in Spalax cell machinery and ultimately lead to the death of cancer-cells. Bioinformatics objectives are a major part of this study. The study could attest to be a breakthrough in cancer research, using the long lived, hypoxia- and cancer-tolerant Spalax as a significant biological resource for biomedical research that hopefully could open new horizons in treatment and prevention of cancer in humans.

<u>**CONTACT:</u>** Applicants that **can fulfill our specified expectations** should submit an extended CV and bibliography, summary of past accomplishments, and contact information of 3 referees, to Prof of Research Aaron Avivi (<u>aaron@research.haifa.ac.il</u>) <u>AND</u> Dr. Imad Shams (<u>imadshams@gmail.com</u>). (<u>http://evolution.haifa.ac.il/index.php/29-people/personal-websites/77-personal-site-avivi</u>)</u>