

Novel Horizons in Cancer Treatment and Prevention (Carmel)

Identifying novel substances and mechanisms to develop cancer-fighting pharmaceutical drugs.

Research with the Cancer-Resistant Subterranean Blind Mole-Rat (Spalax)

Prof. Aaron Avivi (standing) with Dr. Imad Shams and Prof. Irena Marinov
Photo credit: Tomer Appelbaum

Background

Understanding the mechanisms triggering the growth and spread of cancer cells has continuously eluded cancer research. Extensive work has been done with laboratory mice to shed light on the behavior of cancer cells and in attempts to find treatments to prevent and cure cancer in humans and has contributed extensively to our knowledge of cancer cell progression. Yet science has not yet been successful in transferring this knowledge from mice to humans.

Distinguished researchers have suggested that using mice for cancer research is a major obstacle to fundamental advances in human cancer research (Prof. Robert Weinberg, MIT, Newsweek), while evolution has been tuning cancer suppression mechanisms for over a billion years. Hence other, naturally cancer-resistant animal models may be more predictive for treatment and prevention of human cancer.

A Novel Animal Model: Revealing Paths to Cancer Treatment and Prevention

Prof. Aaron Avivi, Dr. Imad Shams and Prof. Irena Manov are conducting research to uncover mechanisms that can prevent the growth of cancer cells and kill existing cancer cells. The team is using a unique organism - the Subterranean Blind Mole-Rat (Spalax), a promising model due to its proven resistance to cancer.

Living in an underground habitat and one of the longest-living rodents in the world (it can live 20 years or more), Spalax is able to survive with an extremely limited oxygen supply - also known as hypoxia, and overcome sharp fluctuations in oxygen availability, thereby avoiding oxidative stress. In humans, hypoxia and oxidative stress are directly related to the development of the most lethal health conditions in the Western world: heart and lung diseases, brain strokes, and above all, cancer. Highly immune to all of these diseases, Spalax is serving Avivi, Manov and Shams as an experimental mammal for progress in treating these ailments in humans.

Research Status

In the course of over fifty years of Spalax studies, including thousands of animals of all ages, spontaneous tumors have never been observed. Avivi, Manov and Shams have failed to induce cancer in the rodent with chemical carcinogens that initiated tumors in 100% of other rodents in the same experiment.

The research has indicated that normal Spalax cells - and only Spalax cells - secrete a substance or substances that kill human cancer cells. The same results were shown for a wide range of cancer cells, including highly aggressive metastatic breast cancer.

It has also been observed that cancer-fighting Spalax cells target only cancer cells and do not kill normal, healthy cells.

Identification and isolation of the secreted substances enabling Spalax to fight off cancer and resolving their mechanisms of action will open new horizons in the development of new pharmaceutical drugs to fight the disease.

Market potential, Investment & partnership opportunities

Carmel established [SpalaRx Ltd](#) to advance and commercialize this technology, with a seed investment from a private investor.

[Contact us for further information.](#)

Haaretz Magazine: [Better check that mole: Has an Israeli biologist found the key to curing cancer?](#)

Video: [The Israeli Subterranean Blind Mole-rat: A Promising Organism for Fighting Cancer in Humans](#)

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