

The Key to Unlocking the Immune System

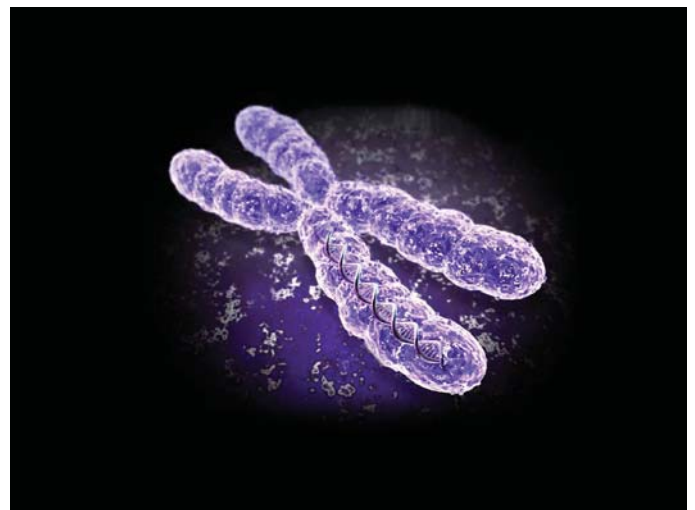
**Greater specificity and
effectiveness while reducing
adverse effects**

The global market for cancer therapies is a \$26 billion industry and growing strongly. Intensifying prevention and accelerating research are, more than ever, topical issues for Pharmaceutical and Bio-Technologic companies.

Breast cancer is a significant health problem in the industrialized western world being the most common form of cancer amongst women in North America and almost all of Europe. To date, there is no single effective treatment for breast cancer although four types of treatment are used in various combinations: Surgery, Radiation Therapy, Chemotherapy and Hormone Therapy. Several of the world's leading pharmaceutical companies are marketing drugs for the treatment of breast cancer but clinical trials continue in order to achieve better performance in the treatment of this disease.

One of the cancers with the highest rate of morbidity today is lung cancer which is the uncontrolled growth of abnormal cells in one or both of the lungs. While normal lung tissue cells reproduce and develop into healthy lung tissue, these abnormal cells reproduce rapidly and never grow into normal lung tissue. Lumps of cancer cells (tumors) then form and disrupt the lung, making it difficult to function properly. The available treatments can prolong the patient's life but complete cures are very rare. Options include surgery, radiation (including radiofrequency ablation), chemotherapy, or a combination of treatments.

Radiotherapy and chemotherapy are the two most widely used treatments for cancer. However they have serious disadvantages including causing severe side effects and not being able to specifically treat the cancerous area (non-specificity). As a promising alternative, a third strategy is being developed; a biological strategy which is hopefully more specific and limits the side effects as biological anti-cancer agents are relatively weaker than other anti-cancer treatments.



In June 2005, a Jerusalem-based company, Immune System Key (ISK) Ltd., was founded by Dr. Yoram Devary, Chairman of the Biochemistry Department and Prof. Uziel Sandler of the

Department of Applied Mathematics at the Jerusalem College of Technology. Dr. Devary, Chairman and Director of R&D at ISK is an expert in the molecular mechanism by which physical and chemical agents transform cells and Prof. Sandler, Vice-Chairman and CEO of ISK is one of the founders of the advanced mathematical discipline called “Fuzzy Dynamics” which describes evolution of complex systems with uncertainty in their dynamic laws.

ISK’s objective is to develop a new therapeutic drug that can distinguish between cancer cells and healthy cells, and induce programmed cell death in cancer cells only, a process known as Apoptosis. Apoptosis is a genetically directed process of cell self-destruction that is marked by the fragmentation of nuclear DNA, activated either by the presence of a stimulus or removal of a suppressing agent or stimulus, and is a normal physiological process eliminating DNA-damaged, superfluous, or unwanted cells. The strategy of developing such a drug promises greater specificity and effectiveness while reducing adverse effects.

ISK has succeeded in isolating and cloning a novel protein, Nerofe in the human thymus. Nerofe plays a pivotal role in the natural constitutively active apoptosis process. The thymus is a glandular structure of largely lymphoid tissue that mainly functions in the development of the body’s immune system. Nerofe, this apoptosis-inducing protein is selectively expressed in the human thymus in Hassal’s Corpuscles where negative selection of cells takes place.

ISK researchers have found that Nerofe has the ability to accelerate the rate of apoptosis in negatively selected cells in the thymus of mice. An interesting observation done with Nerofe is its ability to selectively induce apoptosis processes in cancer cells, and not to harm healthy cells.

ISK is currently carrying out pre-clinical trials to establish initial safety and pharmacological profiles of Nerofe. The company hopes to develop a drug candidate for the treatment of breast and lung cancers. In addition Nerofe shows promise as a treatment for Crohn’s Disease and Ulcerative Colitis, disorders of the intestinal system that cause inflammation of the small and large intestines, and are collectively known as Inflammatory Bowel Disorder (IBD). Both Crohn’s Disease and Ulcerative Colitis are chronic and affect men and women approximately equally. It is most common in northern Europe and North America although the precise cause of Crohn’s Disease remains unknown.

With the numbers of people succumbing to these illnesses increasing annually, researchers continue to search for cures. Dr. Devary and Professor Sandler are optimistic as to the outcome of their research. Hopefully, it is only a matter of time until Immune System Key Ltd. unlocks the mysteries of these diseases and is able to introduce new effective treatments for them.

For additional information regarding Immune System Key Ltd. and its ongoing research, contact Dr. Yoram Devary at development@jct.ac.il or +972-2-675-1269.



Dr. Yoram Devary



Lung Cancer Cells

Facts & Figures

- ▶ Cancer is one of the leading causes of death worldwide. From a total of 58 million deaths in 2005, cancer accounted for 7.6 million (13%). Each year, more than 11 million people worldwide are diagnosed with cancer and it is estimated that by the year 2020, this number will reach 16 million!
- ▶ Each year over one million women worldwide are diagnosed with breast cancer, causing 40,000 deaths annually.
- ▶ The incidence of the disease is increasing in both industrialized and developing countries. There are over 212,000 cases of breast cancer diagnosed in the USA alone each year. In Canada, the figure is over 20,000, Australia 13,000, and in the UK the figure is 41,000. Overall, one woman in every nine will get breast cancer at some time in her life.
- ▶ Lung cancer is the most common cancer worldwide with an estimated 1.2 million new cases annually and is the leading cause of deaths from cancer in the world. Approximately \$9.6 billion is spent each year on the treatment of lung cancer in the United States where it accounts for 28% of all cancer deaths.
- ▶ Approximately 2 million men & women in North America and northern Europe (around 1 in 300) are afflicted with Crohn’s Disease and Ulcerative Colitis (IBD). Recent studies suggest that up to 30% of all newly diagnosed cases are in children and teens under the age of 18. Some 20% of individuals with Crohn’s Disease have a blood relative with some form of IBD. Some ethnic groups (such as Ashkenazi Jews) are known to have a significantly higher rate of prevalence than others.