



NRC Institute for Biological Sciences (NRC-IBS)

Business Opportunity:

Novel Peptide(s) for the Treatment of Cancer

The Business Opportunity

Cancer is the leading cause of premature death in Canada: 954,000 potential years were lost in 2000 as a result of cancer. This represents 31% of the potential years of life lost resulting from all causes of death.

Although many cytotoxic drugs have been developed and refined for the treatment of cancer, biologics are expected to create a 'new wave' of more effective and selective anti-cancer drugs in the future, capturing the large share of the cancer therapeutic market.

NRC-IBS has developed a peptide-based anti-cancer technology platform that has both anti-angiogenic and direct anti-cancer activities and shows efficacy in animal models of selected cancers.

The Technology

Cancer is characterized by uncontrolled division of cells and the ability of these cells to invade other tissues. Angiogenesis and vascular proliferation are essential for the growth and progression of malignant tumors and are used as indicators of the degree of malignancy. Preclinical trials using angiogenesis inhibitors have been very promising, often showing partial or complete tumor regression without any drug resistance. So far, the major achievement in clinical studies has been to stabilize the disease for a sustained period of time. Anti-angiogenic agents are currently used as adjuvant therapy in combination with other anti-tumor treatments.

Results from clinical studies have shown that the inhibition of individual modulators of angiogenesis is not sufficient for sustained response. There is a need for more effective anti-angiogenic agents that are capable of both arresting and reversing tumor growth.

NRC-IBS identified a protein with novel antiangiogenic effects and developed a platform technology based on peptide fragments of a family of similar proteins, which shows anti-tumor efficacy *in vitro* and *in vivo*. The unique competitive characteristics of these peptides are:

- Pleiotropic inhibitory action against diverse stimulators of angiogenesis including IGF-I, VEGF, PlGF, bFGF and S100A4, and
- A direct, angiogenesis-independent, anti-tumorigenic action
- Novel mechanism of action on an enzymatic pathway involved in both angio- and tumorigenesis.

The antiangiogenic and antitumorigenic peptides developed by NRC-IBS have been shown to:

- Inhibit angiogenesis *in vitro* and *in vivo*;
- Inhibit growth of tumor cells in semi-solid agar;
- 'Home-in' into tumors after *i.v.* injection in animals;
- Reduce the rate of growth of xenograft tumors and prolong survival of tumor-bearing animals;
- In a subset of tumors, cause a complete tumor regression;
- Are non-toxic after repeated injection in animals over prolonged period.

Patent Position

Patents Pending – PCT. NRC IBS cases 11627 and 11964.

The Markets

An estimated 149,000 new cases of cancer and approximately 70,000 deaths will occur in Canada each year. In Canada, \$14.2 billion (9% of the total cost of illness), was related to cancer. Approximately \$210 million, or 9% of direct cancer costs, were spent on drugs for cancer treatment. The cost of cancer and effect on the US economy is staggering, at more than \$150 billion in 2002.

Cancer market has traditionally been dominated by chemotherapeutics and adjuvant treatments; the growing segment of this market belongs to biologics (antibodies, peptides, vaccines, anti-sense, etc), which is expected to grow to by 15% annually.

Technology Transfer Possibilities

- A commercial exploitation license for the technology.
- Development of this technology through a joint collaboration.

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