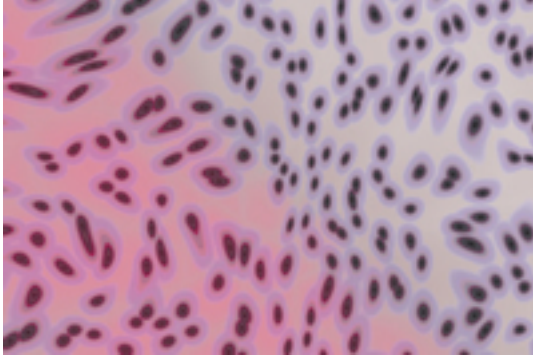


Our current research agenda emphasises five main areas:

### **1. Infectious Diseases:**



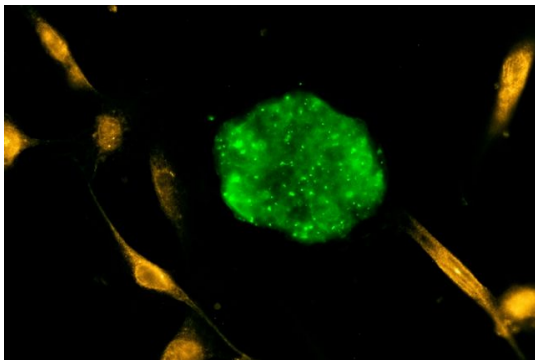
Together with its research collaborators, the Institute is presently developing a superior therapeutic approach for the prevention and treatment of meningococcal disease. This approach is based on a novel prophylactic meningococcal vaccine that would be effective against all strains of meningococci, and a therapeutic endotoxin neutralizing serum for the treatment of severe cases of meningococcal disease. The therapeutic serum against the endotoxin would minimise damage to organs and tissues. The Institute is working closely with the inventors of the technology (which is the subject of a world-wide patent) on the next stage of development – including clinical trials.

### **2. Cancer:**



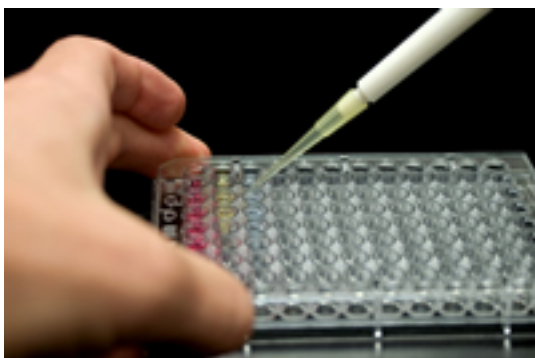
The Institute continues its efforts to further understand the role of B lymphocytes in the immunity of solid tumours such as breast and colon cancer. B lymphocytes are found among the lymphocytes infiltrating cancerous tumours. However, their role in controlling these tumours is poorly understood, largely due to the difficulty of isolating sufficient numbers of such tumour infiltrating B lymphocytes for a proper study. Utilising the Institute's unique single cell analysis technology, it is for the first time possible to study these rare cells that potentially hold the keys to uncovering the mechanisms responsible for tumour regression in patients with naturally occurring anti-tumour antibodies and to developing a more natural approach towards the treatment and management of cancer.

### **3. Single cell analysis, manipulation, differentiation and cloning:**



Drawing on its expertise in expression of human proteins, scientists at the Institute are working on single cells to better understand the characteristics and behaviour of rare cell types involved in health and diseases. These include rare B and T lymphocytes found in some patients who can effectively fight cancer and infections. Presently, the single cell technology is being also applied to uncover mechanisms involved in the differentiation and trans-differentiation of haematopoietic stem cells. The Institute is actively pursuing protection of its discoveries in this area.

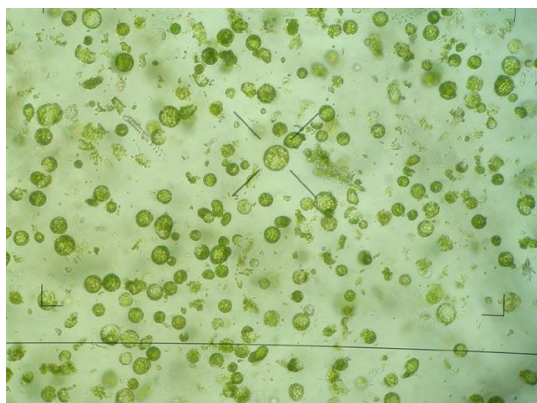
#### **4. Production of Human Therapeutic Proteins:**



The Institute is working on a set of novel technologies for the production of fully human versions of certain therapeutic proteins. Current protein production methods are limited, in that while they allow control of the protein's amino acid sequence, they are not able to effectively replicate the Post Translational Modification (PTM) process that is unique to human cells. Consequently, therapeutic proteins currently available on the market are not complete replicas of the natural proteins, having lower effectiveness and some adverse side effects. The new technology enables the production of certain human proteins in a fully human form, including the key PTM components, and is thus expected to have significant therapeutic and commercial value. In mid 2009, the Institute filed a patent to protect its intellectual property in the field of human protein expression.

In January 2010, the Institute commenced a new phase of research and development in protein production with the establishment of a small scale cell fermentation laboratory to transfer its technology from tissue culture to a small bioreactor.

#### **5. Plant cell hybridisation:**



Through its commitment to interdisciplinary research and partnering with other research institutions, the Institute has explored applications of its expertise, know-how and technologies in other fields of research, in particular plant hybridisation. In contrast to genetic techniques used for modification of plants, the Institute's approach is based on the creation of unique hybrid plants by combining single protoplasts derived from plants of different genera into one hybrid cell. This single hybrid cell could then be induced to generate root and shoot and finally an entire transgenic plant.