Inquiry into developments of high technology industries in regional Australia based on bioprospecting.

A Case for the Development of High Technology Industries in Townsville based on Bioprospecting

James Cook University and its regional partners including the Australian Institute of Marine Sciences (AIMS) believe that the enquiry should be aware of the unique opportunities that exist in the northern Queensland region for the isolation of bioactive compounds from natural biological sources. The unique megabiodiversity of Australia's tropical ecosystems (eg., Great Barrier Reef) is potentially an enormous economic asset to the nation. The following has been prepared with the above in mind.

A unique location.

Situated in North Queensland, Townsville lies adjacent to one of the world's most megadiverse biological regions in the world. Its proximity to the Great Barrier Reef, tropical rainforests and inland savannah areas places Townsville at the centre of a unique mix of biological resources. In association with scientists at the Australian Institute of Marine Sciences (who are restricted to marine related research), scientists at James Cook University have been, and continue to be, directly involved in the collection and screening of organisms from these three diverse biological regions.

Innovative projects

Scientists at JCU and AIMS are signatories to a collaborative agreement encompassing three high technology bioprospecting projects, specifically:

- the development of C_4 specific herbicides from marine organisms
- the development of novel pharmaceuticals from marine organisms
- the development of a robust, simple to use test kit for the detection of paralytic shellfish poisoning.

Other biotechnology projects involving bioprospecting involve the screening of both marine and terrestrial organisms for anti-cancer and neuroactive compounds.

Industry funding.

Scientists at both JCU and the AIMS have been successful in attracting industry support for bioprospecting based projects. JCU and AIMS recently signed a three year, $1.98 million, Research and Development and Licensing Agreement with Nufarm Pty Ltd, a Victorian-based agrichemical company, to conduct research into the discovery and development of novel herbicides.

Spin-off companies

A collaborative research project involving JCU and AIMS was recently awarded $75,000 from the Queensland Department of State Development under the Innovation Start Up Scheme to develop a test kit for paralytic shell fish poisoning. A spin-off company, "Toxitech" is presently being registered to further market this research.

Research into the individual components of venoms from venomous animals found in Papua New Guinea and tropical Australia are being investigated by scientists who are presently setting up a spin-off company, Toxiomics Limited (A.C.N. 096 138 359), centred at JCU. This company will also be involved in the development of antivenoms for venomous snakes of Papua New Guinea and transfer of the technology to PNG.

Tropical location.
From a global perspective the full significance of Townsville's tropical location is just beginning to be appreciated. The research and development of control measures of diseases which affect tropical organisms such as aquaculture species (eg., prawns) can readily be transferred to tropical countries sharing the same climatic and biological conditions. The improvement in the economies of many Asian countries will provide a ready market for potential biotechnology and health products in the future.

In addition the discovery of an active ingredient from a rare marine organism may require the culture of that organism to ensure the natural population is not threatened. This may only be successful in the region from which it is isolated.

The Townsville region is ideally suited to the development of high technology industries based on bioprospecting due to:-

- its tropical location and proximity to a very wide range of biological diversity
- the cooperation of a skilled and experienced work force in biotechnology,
- the ecologically-neutral work practices used in the collection and preparation of biological specimens for screening of biological material
- the imminent opening of the new Townsville General Hospital and the continuing development of the newly opened Medical School at JCU, and
- deep water port and modern airport facilities

<u>Present impediments to growth of new biotechnology industries are:</u>

a lack of state-of-the-art infrastructure,
a lack of state and federal funding for early stage development of biotechnology (presently concentrated in large city centres)
a lack of entrepreneurial leadership in the region

Perhaps the biggest impediment to the regional retention of the value of bioprospecting is the lack of funding to develop a value-added product. Due to lack of state, federal and Australian industry funding researchers are forced to look towards overseas companies to fund research projects at an early stage in the development of a specific product. This fact, more than any other, contributes to the low returns of conducting research in biotechnology in Australia. Provision of funding to support the development of products to a stage where the value of individual products is realised maximises the value of

bioprospecting to Australia and, more importantly, to the region in which the research is conducted.