

## **ARTIFICIAL CELLS: WHAT? HOW? WHEN? WHERE?**

### **Quoted from the United Kingdom journal, New Scientist ( by Leigh Dayton):**

In 1957, Thomas Chang was completing his final year as an undergraduate at McGill University in Montreal. .... He would make the first artificial cell.....has grown into a dynamic field ....now a sophisticated marriage of microbiology, chemistry and biotechnology, the concept remains as straightforward as Chang's original notion. .... Researchers can now create artificial cells with roughly 30 different polymers, as well as several kinds of proteins..... also ... lipids. An artificial cell can contain virtually anything: oxygen, drugs, enzymes, antibodies, cell extracts and even cells themselves.....detoxifying.. poisoning.."hemoperfusion" .... treatment of enzyme-deficiency diseases ... insulin-secreting cells ....diabetes.  
.....in the long term? will synthetic cells fly in space with astronuat, coverting their body wastes into useful amino acids and proteins? Will miniaturised surgical robots travel in microcapsules to sites in the body that are inaccessible to human surgeons? Will artificial cells and organs one day outperform their biological counterparts?.

### **Quoted from the Journal of the British Royal Society of Chemistry , Chemistry in Britain:**

Professor Tom Chang .... when he started work in the 1950's he was ploughing a lone furrow. In the past five years "designer cells" have become fashionable .... with unexpected results. "Artificial cells" already have many medical applications. it is used in cases of chronic renal failure, drug poisoning, liver failure, enzyme therapy and metabolic function replacement.  
He told chemistry in Britain: "When I first started work it was considered too far- fetched, but by 1966 when I demonstrated the value of artificial cells in hemoperfusion and detoxification there was a surge in interest and curiosity.  
Since 1985 interest in artificial cells and especially modified hemoglobin as blood substitute has taken off. He could be on his way to a bloodless coup in the search for an alternative to blood transfusion.

### **Quoted from "Blood Weekly":**

The conference (VI International Symposium on Blood Substitutes,1996, McGill University) coincides with the 40 year anniversary of Chang's initial efforts back when he was a student at McGill University. This started what might be termed the modern approach of red blood cell substitutes. The year 1996 also is 175th anniversary of McGill University, where Chang and his colleagues have been instrumental in advancing the field of blood substitutes research.

### **Quoted from "American Medical News (American Medical Association)" Nov 16, 1998:(by Mark Moran)**

"For nearly 40 years, Dr. Chang has pursued the development of artificial blood, and his work has laid the foundation for products that may be available in coming years. These products, however, are not true red blood cells but modified hemoglobin molecules for short-term transport of oxygen.Today, Dr.Chang is working on products that more closely resemble nature's own creation.

### **Quoted from "Orive et al, Nature Medicine 2003, 9:104-107"**

In 1964 (Science 146, 524-525), T.M.S. Chang proposed the idea of using ultrathin polymer membrane microcapsules for the immunoprotection of transplanted cells and introduced the term "artificial cells" to define the concept of bioencapsulation.

### **Quoted from feature article on "Going Cellular", Modern Drug Discovery, ACS Publication by Mark S. Lesney 2002**

"As can be expected, research into various capsular materials is almost as important as studying the requirements and kinds of cells that can be appropriately transplanted. The first encapsulated cells were developed as far back as the 1960s, when T.M.S. Chang and colleagues first reported the development of semipermeable aqueous microencapsulation of cells. The vision of using these cells for therapeutic purposes was present from the start".

