

United States Patent [19]

Goosen et al.

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[54] **MICROENCAPSULATION OF LIVING TISSUE AND CELLS**

[75] Inventors: **Mattheus F. A. Goosen; Geraldine M. O'Shea**, both of Toronto; **Anthony M. F. Sun**, Willowdale, all of Canada

[73] Assignee: **Connaught Laboratories Limited**, Willowdale, Canada

[*] Notice: The portion of the term of this patent subsequent to Jun. 16, 2004 has been disclaimed.

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[22] Filed: **Jun. 8, 1987**

Related U.S. Application Data

[63] Continuation of Ser. No. 677,985, Dec. 4, 1985, Pat. No. 4,689,293, which is a continuation of Ser. No. 501,445, Jun. 6, 1983, abandoned.

[51] Int. Cl.⁴ **A61K 9/44**

[52] U.S. Cl. **424/424; 424/422; 424/423; 435/240.22; 514/964**

[58] Field of Search **424/16, 21, 422, 423, 424/424; 514/964; 435/240.22**

[56] References Cited

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Primary Examiner—Sam Rosen

Attorney, Agent, or Firm—Sim & McBurney

[57] ABSTRACT

Living tissue or cells, for example, islets of Langerhans, are microencapsulated for implantation in the body for long term treatment of diabetes or other disease requiring organ transplantation. The microcapsules take the form of a biocompatible semi-permeable hydrogel membrane which permits the passage of materials and oxygen to the cells and metabolic products from the cells while retaining the cells encapsulated. The biocompatible semi-permeable membrane has an outer negatively-charged surface, which imparts to the microcapsules the ability to maintain long term effectiveness.

18 Claims, No Drawings