ELSEVIER

European Journal of Pharmaceutics and Biopharmaceutics 45 (1998) 1

European Journal of Pharmaceutics and Biopharmaceutics

Editorial

Microencapsulation technology, discovered by scientists nearly a half-century ago, is a process whereby small, discreet solid particles or small liquid droplets are completely surrounded and enclosed by an intact shell. The first commercial use of microencapsulation was carbonless copy paper and since those early days, microparticles and microcapsules have found extensive usage in the chemical, aerospace, agricultural, medical, and pharmaceutical industries. Early applications in the pharmaceutical area, focused on solving problems relating to flow, volatility, incompatibilities, and taste masking of drugs. A plethora of reports have appeared in the scientific literature that attests to the applications of microparticles and microcapsules to solve problems related to controlling drug release and to improving drug stability.

This theme edition of the Journal has focused on microparticles and microcapsules and their properties and applications in clinical medicine. In addition, the applications of microparticulates in targeted and controlled release drug delivery systems, are addressed. The encapsulation of biologically active materials was first reported by Professor Chang at McGill University over 40 years ago. In this report, hemoglobin, enzymes and other contents of red blood cells were encapsulated. A chronology of the pharmaceutical and therapeutic applications of artificial cells, including microencapsulation, is the subject of the review article in this current theme edition.

The acrylic polymers (Eudragits) have been extensively used in film coating and in matrix micropellet systems to control drug release in the gastrointestinal tract. Some of these acrylic polymers possess charged functional groups that can interact with the encapsulated drug. ^{13}C solid-state NMR was employed to elucidate the physical-chemical association of acyl esters of salicylic acid with Eudragit RS100.

The biodegradable polymers (PLA and PLGA) have received a great deal of attention in the scientific literature during the past 10 years. Significant problems have been experienced by researchers in this field with optimizing the drug loading of water soluble agents and controlling the release of these drugs and macromolecules from the resulting microspheres. The detrimental influence of solvents and surfactants, as well as the polymer itself, on the stability of the macromolecule is a challenging problem to be resolved. Since these polymers degrade to dimers and monomers of lactic and glycolic acid, the stability of the macromolecule in the microparticulate, during storage, is also of concern. Several novel methods including the multiple emulsion technique have been employed to control the particle size of the microsphere, while maintaining a balance between drug loading efficiency and the release kinetics of the active form from the particles. The controlled production of biodegradable microparticulates with supercritical gases is reported in this theme issue. Microparticulates in the 6–50 μm size range were obtained using the aerosol solvent extraction technique. Aqueous and nonaqueous solvent evaporation methods as well as a novel emulsion solvent diffusion method were used to entrap therapeutic peptide drugs in PLGA microparticulates. The emulsion solvent diffusion method requires a terminal freeze drying step to achieve drug containing powdered nanoparticles. Properties of particulates prepared by extrusion and spheronization are reported in this edition. Biodegradable proteins and polysaccharides, including collagen and chitosan, respectively, have also been explored as drug carriers for specific drug molecules that target certain diseases.

The interest in microencapsulation technology has expanded on an international level and the Eleventh International Symposium on Microencapsulation was recently held in Bangkok, Thailand, during August 1997. The next symposium will be held in Jerusalem in the Fall of 1999. Every 2 years, the world's premiere scientists in this field of technology gather to report their research results. These scientists each share the common goal to apply the principles of biology, chemistry, clinical science, and process engineering to solve complex clinical and drug delivery problems in order to maximize drug therapy and to target drug molecules to the desired site of action.

James W. McGinity
University of Texas at Austin

PII S0939-6411(97)00157-4