Pursuing Leuprolide release from poly lactide-co-glycolide polymer by means of different spectroscopic methods

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Leuprolide acetate (LPA) is frequently administered in treatment of a wide range of sex hormone related disorders including malignant prostate cancer, endometriosis and precocious puberty [1]. Its short biological half life (nearly 4 hrs.) is considered as the major shortcoming of this GnRH analogue which requires frequent injection in a daily dosage schedule [2]. This problem can be overcome using degradable polymeric drug delivery system that encompass and release a sufficient amount of active agent for sufficient therapeutic period (1, 3 and 6 months in this case). These delivery systems have unique challenges associated with their development that are related to both protein release kinetics and its stability. The objective of this study was to determine the stability of the released leuprolide acetate in vitro using UV-Vis, fluorescence, and CD spectroscopic techniques.
Release of the drug into 4 ml of the fresh carbonate buffer solution (pH = 7) at 37◦C was measured every 24 hrs for one month. Although a clear interpretation of the CD spectra is faced to some ambiguities, the first derivative of the UV-Vis spectra alongside with the fluorescence results indicate that the tertiary structure of the peptide has suffered little destruction during its stay in the polymer formulation.

1 Plosker, G.L.,Brogden, N.,(1994) Drugs,Vol 48 No 6, 930-967.

2 Sennello L.T., et al. (1986) J. Pharm. Sci. 75:158-60.