Drug release from medical devices: modelling and computational aspects

Giuseppe Pontrelli

Istituto per le Applicazioni del Calcolo- CNR, Italy

giuseppe.pontrelli@gmail.com

Abstract

I will present a mathematical model describing the dynamics of a substance between a multi-layer media of different properties and extents. The model incorporates drug diffusion, dissolution and solubility in the polymer coating, coupled with diffusion, convection and reaction in the biological tissue, resulting in a nonlinear system of partial differential equations [1]. The model is used as predictive tool for a fundamental understanding of drug transport in the skin, possibly enhanced by an electrical field, as in iontophoresis. The results show the roles of the different model parameters, to evaluate drug release efficacy and to assess an optimal control strategy of delivery systems. .

Keywords: drug release, transdermal drug delivery, iontophoresis, numerical methods.

References

[1] S. McGinty, G. Pontrelli, *A general model of coupled drug release and tissue absorption for drug delivery devices*, J. Contr. Release, 217:327-336, 2015.