

Reaction-Diffusion Systems Modeling in Medicine and Biology: Modeling Cases from Colombia

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ABSTRACT: Following the assumption that parathyroid hormone-related protein and Indian hedgehog form a biochemical regulatory loop for the endochondral process and bone morphogenetic protein 2 and Noggin in the intramembranous process, this talk will describe these regulatory mechanisms. For this purpose, we use a set of reaction-diffusion equations that are widely used in morphogenesis, in which biochemical factors are assumed to be secreted by precursor cells, mesenchymal cells and chondrocytes, in endochondral and intramembranous ossification, respectively. The solution leads to the so-called Turing patterns, which represent these processes of ossification in a very approximate way. This talk also gives information on the research in Biomimetics Laboratory and Group of numerical methods in engineering in Universidad Nacional de Colombia.