Mathematical analysis and simulations involving chemotherapy and surgery on large human tumours under a suitable cell-kill functional response

Diego S. Rodrigues
UNESP - Univ Estadual Paulista, diego@ibb.unesp.br

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Mathematical analysis and simulations involving chemotherapy and surgery on large human tumours under a suitable cell-kill functional response

Authors: Diego S. Rodrigues and Paulo F. A. Mancera

Abstract. Dosage and frequency of treatment schedules are important for successful chemotherapy. However, cell-kill response and tumoral growth should not be seen as separate and therefore are essential in cancer modeling. Concerning this issue, and under a suitable cell-kill dynamics, in this talk I will present a mathematical model for sequencing of cancer chemotherapy and surgery of large human tumours. Biological and pharmacological data are used in a numerical approach, where drug administration occurs in cycles (periodic infusion) and surgery is performed instantaneously. Considering a continuous chemotherapeutic drug administration, a stability analysis is also presented. In according to Norton & Simon hypothesis, our results indicate that chemotherapy is less efficient in treating tumours that have reached a plateau level of growing and that a combination with surgical treatment can provide better outcomes.