

## **Regression of tumour cells in breast cancer administrating chemotherapy using MTD and metronomic techniques**

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To gain deep insights into the interactions among major types of cells, such as healthy, tumour, and immune cells, in a tumour-bearing host, we propose a mathematical model consisting of four delay differential equations by considering the inherent delay in the tumour cells' life cycle. When choosing model parameters, sensitivity analysis justified previous assumptions had been considered.

Since the impact of immune system is decisive on the regression of tumour cells, stability analysis is performed for two different levels of immune system surveillance, that is, healthy and compromised tumour-bearing host.

Theoretically, it has been showed that in a healthy host the immune system is able to eradicate the tumour cells completely whereas in presence of weak immune system tumour cells have the opportunity to keep proliferating.

The latter case, necessitates an efficient treatment, and more precisely a combination of different treatments, for being able to fight and demise tumour cells.

Nowadays, Chemotherapy is the most common treatment which is administrated in various protocols. Among them, MTD (Maximum Tolerated Dosage) and Metronomic are of great significance in clinical observations. Our model suggests that Metronomic technique surpasses MTD after introducing this treatment. The last but not the least, since the results of mathematical experiments illustrate the administrated Chemotherapy protocols are not able to eradicate the tumour cells, the proposed model unveils the demand for an adjunct treatment.

**Primary author:** ANSARIZADEH, Fatemeh

**Co-author:** Dr ZHANG, Tonghua (Swinburne University of Technology)

**Presenter:** ANSARIZADEH, Fatemeh

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