

## **"Metastases Growth of Colorectal Cancer**

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Colorectal cancer (CRC) is one of the most common causes of cancer-related mortality worldwide. Most cases of deaths result from metastases, assumed to be shed, in many cases, before disease detection. Providing reliable predictions of the metastases' growth pattern may help planning treatment. Available mathematical tumor growth models rely mainly on primary tumor data, and rarely relate to metastases growth. The aim of this talk was to explore CRC lung metastases growth patterns. We used data of a metastatic CRC patient, for whom ten lung metastases were measured while untreated by seven serial computed tomography (CT) scans, during almost three years. Three mathematical growth models - exponential, logistic and Gompertzian - were fitted to the actual measurements. Goodness of fit of each of the models to actual growth was estimated using different scores. Factors affecting growth pattern were explored: size, location and primary tumor resection. Exponential growth model demonstrated good fit to data of all metastases. Logistic and Gompertzian growth models, in most cases, were overfitted and hence unreliable. Metastases inception time, calculated by backwards extrapolation of the fitted growth models, was 8-19 years before primary tumor diagnosis date. Three out of ten metastases demonstrated enhanced growth rate shortly after primary tumor resection. Our unique data provide evidence that exponential growth of CRC lung metastases is a legitimate approximation, and encourage focusing research on short-term effects of surgery on metastases growth rate.