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Leonid Hanin* (hanin@isu.edu), Department of Mathematics and Statistics, Idaho State University, 921 S 8th Avenue, Stop 8085, Pocatello, ID 83209-8085. *Metastasis Suppression by the Primary Tumor: A Natural Law.*

We study metastatic cancer through an extremely general individual-patient mathematical model that is rooted in the contemporary understanding of the underlying biomedical processes yet is essentially free of specific biological assumptions of mechanistic nature. The model accounts for primary tumor growth and resection, shedding of metastases and their selection, dormancy and growth in a given site. Functional parameters descriptive of these processes are assumed to be essentially arbitrary. In spite of such generality, the model allows for computing the distribution of the sizes of detectable metastases in closed form. Under the assumption of exponential growth of metastases before and after primary tumor resection, we showed that, regardless of other model parameters and for every set of volumes of detected metastases, the likelihood-maximizing scenario is always the same: complete suppression of metastatic growth before primary tumor resection followed by an abrupt growth acceleration after surgery. This scenario is commonly observed in clinical practice and is supported by a wealth of studies conducted over the last 110 years. (Received September 12, 2018)