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Letter to the editor

Guiot et al., (2003) recently proposed a universal law of tumor growth that includes rescaling. Other than that, it is very similar to the well-known damped exponential Gompertzian model that was originally proposed by Laird in 1964 (Laird, 1964). As my colleagues and I reported in 1994, the Gompertzian model was proposed by Laird to be valid for all tumors in all species and is the basis for much of cancer chemotherapy, however it is based on relatively scattered data from only 18 rodents and one rabbit (Retsky et al., 1994).

Tumor growth is very heterogeneous and it is not enough to just provide a good fit to the mean tumor size as a function of time. That is not to say that empirical approximations are useless in research. What is perhaps needed is a flexible parametric family of functions to serve all practical purposes of a specific analysis of experimental or clinical data (Yakovlev, 1996; Yakovlev and Tsodikov, 1996).

In general, it is difficult to prove that a law is universal since you can never fully demonstrate that the unlimited universe of possible situations is governed by this particular theory. However, it is easy to disprove a putative universal law by showing just a few cases in which it does not agree with data.

It is undeniably true that multipassaged animal models of cancer gradually approach a damped exponential. This gradual transition from an erratic pattern to regular repeatable smooth growth (easily described by an equation) is seen in data from Steel (1977).

There are few growth data for human cancer for the obvious reason that it is not ethical to just observe a growing cancer without intervening. However years ago, watchful waiting was quite common and as a result there are well-documented long duration growth data in the old literature—prior to papers included in computerized searches. I have reported over 100 examples of human and animal tumor growth that seemingly defy any simple mathematical description (Retsky et al., 1990). Guiot et al. is wrong in leaping from a few examples to a broad generalization.

I challenge Guiot et al. to show that their self-proclaimed universal growth law will fit my collected data (Retsky et al., 1990) of experimental and clinical tumor growth.

A major problem is that Gompertzian growth (or the Guiot et al. universal growth) does not allow for temporary dormancy of a tumor—which is commonly seen (Klauber-DeMore et al., 2001). There are periods of time (years in some cases) when tumors do not grow and then grow again later.

In addition, Guiot et al. cited human breast cancer data from Norton that agree with the universal law. However, Norton's data were cherry-picked from a larger set that included tumors that displayed temporary dormancy and did not agree with the Gompertzian growth model (Retsky et al., 1989; Norton, 1989). The use of Norton's data (from which dormancy data were excluded) to prove tumor growth does not include temporary dormancy and can be described by a universal law is circular reasoning.

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