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Robert Gatenby* (robert.gatenby@moffitt.org), 12902 Magnolia Dr, Tampa, FL. *Ecology and evolution in control and cure of metastatic cancers.*

Clinical oncology investigations have largely focused on new drug discovery. However, most metastatic cancers remain fatal because even highly effective treatments usually fail due to evolution of resistance. Arguably, Darwinian dynamics are thus the proximate cause of death in many cancer patients.

From an evolutionary perspective, the conventional "maximum tolerated drug dosage" strategy is often suboptimal because it imposes maximal selection pressure for resistance while eliminating the treatment-sensitive populations, which are potential competitors.

An alternative approach seeks to prolong response and tumor control by exploiting evolutionary principles through modulating the treatment schedule to suppress proliferation of resistant population. Studies have found this approach can be successful.

More recent work has proposed evolutionary dynamics can be used to cure currently fatal cancers by strategic sequencing of available agents. This is based on a paradigm that curing cancer is equivalent to an Anthropocene extinction and can be achieved through a series of frequently small eco-evolutionary perturbations. Examples include treatments for pediatric Acute Lymphocytic Leukemia. Clinical trials using this extinction strategy" are now underway. (Received September 16, 2020)