1145-92-1108 **Robert Gatenby*** (robert.gatenby@moffitt.org). *Mathematical Models to Guide Cancer Therapy.*

A number of successful systemic therapies are available for treatment of disseminated cancers but response to treatment is almost invariably transient due to emergence of resistant populations. Although cancers are highly dynamic systems, treatment is changed only when the tumor progresses. But, successful tumor adaptation begins immediately upon administration of the first dose. Applying evolutionary models to cancer therapy demonstrate the potential advantage of using more dynamic, strategic approaches that focus not just on the initial cytotoxic effects but also on evolved mechanisms resistance and the associated phenotypic costs. The goal of evolutionary therapy is to prevent or delay proliferation of resistant populations. Examples include adaptive therapy and double bind therapy. The former continuously alters therapy to maintain a stable tumor volume using a persistent population of therapy-sensitive cells to suppress proliferation of resistant phenotypes. The latter uses cytotoxic effects of an initial therapy to promote phenotypic adaptations that are then exploited using follow-on treatment. Ongoing clinical trials using treatment protocols based on mathematical models of evolutionary principles will be presented. (Received September 19, 2018)