

Introduction

One of the most interesting, and potentially valuable, paradigm-shifts in the field of cancer pharmacology comes from the accumulating evidence that cancer cells, transformed by virtue of a cascade of apparently irreversible molecular genetic events, still carry within themselves information sufficient for normal growth, development and function. More compelling yet is the evidence, which wraps up this symposium, that relatively simple chemical agents have the capacity to elicit normal differentiation, including suppression of unregulated cell growth, both *in vitro* and under controlled clinical conditions, leading to significant changes in the natural history of selected malignancies. Between the hypothesis and the clinical application of induced differentiation as a pharmacological strategy lies a wealth of basic biological research addressing the fundamental regulatory systems and control mechanisms which modulate the cell division cycle, cellular proliferation, gene expression and the critical points at which developmental decisions concerning lineages and terminal cell differentiation are made and implemented. The harnessing of current research in these areas toward the development of novel approaches to the treatment of cancer represents the underlying motive and thrust for this symposium.

To this end this symposium on The Pharmacology of Cell Differentiation has been structured to begin with an exploration, first, of general, then more specific mechanisms implicated in the inter- and intra-cellular systems exploited by cells for the transduction of growth and developmental signals, then to examine the intracellular machinery for cell growth regulation, the gene-expression control mechanisms identified in transformed and normal cells, and finally to move to selected examples illustrating the exploitation of these findings for the induction of developmental changes in real cancers. This is not a review of established successes in cancer therapy; rather it is a progress report on work on-going at one of the frontiers of contemporary pharmacology.

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