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# Cancer and personalized medicine: Advances and conundrums in cancer therapy- A perspective on how to improve foresightedness and pioneer cancer treatment innovations

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Despite significant increases in the numbers of persons surviving cancer, there yet exists a vast rift in the number who dies each year despite treatment. It remains a challenging disease to treat, in part, due to the heterogeneity of the malady. It is widely accepted that virtually all cancers are highly heterogeneous and that subpopulations of cells within a single tumor can exhibit distinct genomic, protein and metabolic divergent profiles. These profound and complex profiles develop into and result in an individualistic shrewd and capricious phenotype leaving an imprint, established and ascribed to that specific tumor. Furthermore, tumor cells experience a range of microenvironmental cues, which would in turn, translate into a range of phenotypic manifestations, contributing to morphologically dissimilar cellular lineages and tissues, within the tumor milieu. Thus, interactions of tumor cells with their microenvironment mutually shape tumor behavior and phenotype. Likewise, plasticity of tumor cell phenotypes would necessarily also influence the apoptotic and autophagic responses. The clinical relevance is that this disparate and divergent heterogenicity contributes significantly to the efficacy of drug therapy and therefore imparts considerable inter-individual variation in pharmacotherapy and clinical response to a myriad of agents. Accordingly, this tumor intra-/inter- incongruence in breast cancer patients, underscores the necessity to personalize therapeutic regimens favoring more personalized patient care throughout monitoring disease progression, relapse and remission states. Our lab briefly delineates a reliable *in-vitro* test that employs a more scientific and logical approach to identify drug(s) and drug combinations that may be efficacious against a specific patient's tumor *in-vivo*. The patient's own tumor mass is fully disaggregated and as such, all cells (microenvironment) that compose the tumor are subjected to cytotoxic/cytolytic agents. The end-point is cell death which correlates to clinical outcomes of progression-free and overall survival in cancer patients. In summary, our studies do validate that *in-vitro* testing does qualify as a tool that can assist and guide oncologists to the most efficacious therapy(s) for their patients but also further demonstrates the necessity to individualize chemotherapeutic regimes. Nonetheless a randomized controlled clinical trial must be designed to further correlate and validate our studies and to fully appreciate the impact of *in-vitro* chemoresistance and sensitivity testing on cancer recurrence and survival rates.

## Biography

Sherry A Bradford has attended undergraduate school at SUNY at Buffalo and has done her PhD in Biochemistry from the University of Buffalo. During her clinical laboratory vocation, she was solicited by the Chief of Surgery at Millard Fillmore Hospital, Buffalo, NY, to direct the Surgical Research Laboratory. She was awarded for Excellence in Research by the American Federation for Clinical Research, and for the Excellence in Research – SUNY at Buffalo. Currently, she sits on the Editorial Board of many reputed national and international journals and has authored and co-authored a number of scientific peer-reviewed manuscripts. She is also a member of many professional organizations including: International Metabolic Cancer Group, AACR, ASCO and GLIFCA.

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