Preface

I thank the Management of the International Journal of Huan Genetics for having been given the opportunity to edit this *Special Issue*. This collection of nine papers will enable the researcher/student and the clinician in better appreciating the importance of *GENE EXPRESSION SIGNATURES* (GES), which can potentially improve diagnosis and/or prognosis. Cancer is a multi-factorial disease and the approach has been to identify biomarkers in the continuum between the onset and disease progression. Ralhan's review provides a comprehensive analyses of gene expression patterns and proteomic signatures of oral dysplastic lesions and squamous cell carcinomas with diagnostic and/or prognostic potential as well as possibly help in identifying novel targets. In addition, an emphasis was placed on global collaborative efforts and inter-laboratory validation. This paper as well as Vemuganti and Kannabiran's article reiterates the importance of inter-laboratory validation of microarray technology as well as other techniques like "parallel signature DNA sequencing" and the importance of obtaining such signatures in identifying the key players which define pleuripotency in stem cells. This paper also dwells on the importance of the tissue microenvironment in modulating genes involved in their differentiation. The importance of Neotic cells, with "transient stem cell properties" in cancer has been underscored by Rajaraman et al. and the tremendous potential of computerized video time-lapse microscopy in the real time visualization of such events. Zingde has emphasized the importance of validating of existing proteomic signatures, and that, techniques like multi-western as well as multiple ligation probe amplification have tremendous potential for gene expression profiling using tissues obtained by minimally invasive methods (buccal scrapings). Pandey et al. complements this paper by underscoring the recent advances in proteomic technologies like Surface Enhanced Laser Desorption Ionization Time-of-Flight (SELDI-TOF) Mass Spectrometry, for characteristic protease profile signatures, that can be part of a battery of clinical diagnostic tests. Breast cancer, being a classical model for tumor heterogeneity, Ramanathan and Rajkumar, have underlined the fact that microarray is fast gaining in popularity in providing better prognostic and predictive information on the disease. Presently, the technology is expensive and may not be affordable. Therefore, apart from inter-laboratory validation, cost-effective approaches should also be developed and/or validated. Joseph and Kumaramanickavel have outlined the benefits of cost-effective methods like RB1 mutation screening, conventional karyotyping and methylation analysis in Indian patients. In this regard, a financial savings of 3.5 fold for the proband and 6.1 fold for a nuclear family was obtained when compared to the costs involved when patients were examined under anesthesia. Dopp's paper elaborates on the important role of free radicals (oxidative stress) in fiber-mediated genotoxicity and it is pertinent to point out that there are commonalities in signaling mechanisms as observed in other cancers. Finally, we have focused on *in vitro* approaches that can enhance the predictability of GES with the understanding that such methods should be validated clinically. Correlation of results obtained sampling blood and saliva, using a wide variey of experimental approaches, with those obtained from immuno-histochemical analysis must be made. Such data should be compared with those obtained from archived samples in tissue repositories. Collaborations (for e.g., multi-centric projects), in India as well as globally, that will synergize the efforts of clinicians, epidemiologists, scientists (wet-lab and social), computational biologists and bio-informaticians will improve our ability for inter-laboratory comparison of data. Cost-effective methods without compromising on the sensitivity, specificity, reproducibility, robustness, scalability, and ease of operation would be especially relevant in translating research ideas from the bench-side to the chair-side/bedside. I would like to convey my heart-felt gratitude to Dr. R.Gunaseelan, Medical Director and Managing Trustee, Chennai Dental Research Foundation (CDRF) and Rajan Dental Institute (RDI) for his insightful comments, constant inspiration, encouragement and support. My thanks are also due to Dr. B. Praveen, Chief Executive Officer and Dr. K. Ranganathan, Research Director for their thought-provoking and intellectually stimulating discussions. My gratitude are also due to the other research assistants and/or clinicians at Chennai Dental Research Foundation (CDRF) / Rajan Dental Institute (RDI).

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