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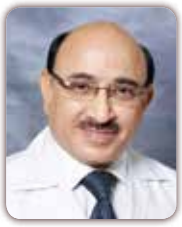

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Personalized medicine: Rays of hopes to cure of cancer

Cancer is among the leading cause of death all over the world. Every year millions of cancer patients are enrolled for cancer treatment in which only few patients survive with present cancer therapy. Since last two decades, the revolution has occurred in health care industries. Completion of human genome project by Dr. Francis Collins has introduced the molecular profiling of individual cancer patient to diagnose cancer more precisely than any other method. It has also allowed clinicians to prescribe appropriate therapies which match with cancer patient's own profile. This new form of medicine is termed as a personalized medicine. Worldwide, personalized medicine programs have focused on analysis of genetic profile of cancer patients by using whole genome sequencing of cancer patients to get precise advice for cancer treatment. However, it is understood that the outcome of cancer treatment is not determined only by the variation in the genetic makeup of a tumor but also inter patient variations in pharmacokinetics which may give rise to drug resistant. Therefore, personalized medicine requires not only to characterize tumor cells but also to see the individualized drug resistant effect on these patients. Protein kinase activity is significantly increased in most of cancers and thus the protein kinase inhibitors play very important role in treatment of various cancers. 17 small molecules and 4 antibodies are approved as protein kinase inhibitors, as cancer therapeutic drugs. These drugs interact with specific site of cancer cells and bring out significant inhibition of cancer cell growth. Most of these drugs are focused on only 8 common linkage targets i.e. VEGF or VEGFR, PI3K, EGFR2 (HER2), mTOR, EGFR, MET, PDGF or PDGFR and KIT. Presently HER2 antibody Trastuzumab is used in HER2 positive breast cancer patients. Similarly, BCR-ABL1 inhibitor Imatinib is used in chronic myeloid leukaemia. Whereas, Gefitinib and Erlotinib which are EGFR kinase inhibitors are used in Non-Small-Cell Lung Cancer (NSCLC). BRAF inhibitor Vemurafenib is used in melanoma and the dual ALK-MET inhibitor Crizotinib is used in NSCLC. Kinase inhibitors for cancer therapy are very much dependent on predictive biomarkers expressed on cancer patient's cells. Thus the presence or absence of these predictive markers is directly linked to the response rates of particular targeted therapies with small-molecule kinase inhibitors or antibodies. Similarly, latest innovation in analysis of liquid biopsy is also given a non-invasive platform for doing molecular profiling of cancer patients without taking tissue biopsy. Next-generation sequencing potentiates the sequencing of circulating tumor cells or cell-free DNA in liquid biopsies of cancer patients which helps in diagnosis and therapy of cancer. So over all, we are confident that in near future we can be able to implement personalized medicine treatment to counteract with the cellular and molecular heterogeneity of cancer and its drug resistance to cure the cancer.

Biography

Pravin D Potdar has completed his PhD from Tata Memorial Centre, Mumbai in 1991. He has been working in the field of Cellular and Molecular Biology of Cancer. He has retired from Jaslok Hospital & Research Centre, Mumbai as a Head, Department of Molecular Medicine

& Biology, after servicing there for 12years. He has established Molecular Diagnostics & Stem cell Research Laboratories at Jaslok and carried out various research Program in the field of Cancer Genetics and developed innovated technologies which can help to diagnose and treat various cancers. He has published 81 papers in national and international journals. He is an Editorial Board of various journals. He is a recipient of National Cancer Institute, USA award and also holds Faculty position at M D Anderson Cancer Centre; Houston TX, USA, He is currently working at Dr A.P.J. Abdul Kalam Research Institute, India.

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