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Personalized and precision oncology through the view of translational applications and innovative tools to manage cancer progression

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A new systems approach to diseased states and wellness result in a new branch in the healthcare services, namely, personalized and precision medicine (PPM) to stimulate the development in a variety of clinical disciplines includ-ing Personalized and Precision Oncology (PPO). To achieve the implementation of PPO concept into the daily practice, it is necessary to create a fundamentally new strategy based upon the subclinical recognition of cancer-associated bioindicators (biopredictors and biomarkers) of pre-cancer abnormalities long before the disease clini-cally manifests itself. Each decision-maker values the impact of their decision to use PPO on their own budget and well-being, which may not necessarily be optimal for society as a whole. It would be extremely useful to integrate data harvesting from different databanks for applications such as prediction and personalization of further treat-ment to thus provide more tailored measures for the cancer patients and persons-at-risk resulting in improved out-comes whilst securing the healthy state and wellness, reduced adverse events, and more cost-effective use of healthcare resources. Rapidly improving understanding of PPO, emerging novel therapeutics, and increasingly available and affordable next-generation sequencing have created an opportunity for delivering the genomically informed personalized cancer therapy. Alterations that are targetable either directly or indirectly with approved or investigational therapies are potentially "actionable." At this time, evidence linking predictive biomarkers to thera-pies is strong for only a few genomic markers in the context of specific cancer types. Deciding what therapy op-tions to pursue can also be daunting, especially when tumors harbor more than one potentially actionable aberration. Further, different mutations/variants in a single gene may have different functional consequences, and response to targeted agents may be context dependent. However, early clinical trials with new molecular entities are increasingly conducted in a biomarker-selected fashion, and even when trials are not biomarker-selected, much ef-fort is placed on enrolling patients onto clinical trials where they have the highest probability of response. Imple-mentation of PPO requires a lot before the current model “oncologist-cancer patient” could be gradually displaced by a new model “medical advisor-healthy person-at-risk”. This is the reason for developing global scientific, clini-cal, social, and educational projects in the area of PPO to elicit the content of the new branch. Recognizing the need to define the policies required for sustained innovation in cancer research and care in an era of cost contain-ment, the stakeholder community must engage in an ongoing dialogue and identify areas for collaboration.

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