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PRESS RELEASE

The growing role of precision and personalized medicine for cancer treatment

January 21, 2019 — A group of Rutgers Ph.D. fellows and faculty published a review paper on the transformative potential of precision and personalized medicine (PPM) for cancer treatment. Their analysis considers the entire process from acquiring PPM data, to developing a PPM product, and addresses broader economic and societal consequences. This review paper is the culminating achievement of a cohort of twelve Ph.D. student fellows at Rutgers that were funded under the US Department of Education Graduate Training in Emerging Areas of Precision and Personalized Medicine Grant (Award Number P200A150131). Professor Martin Yarmush served as the Program Director and Principal Investigator of the award.
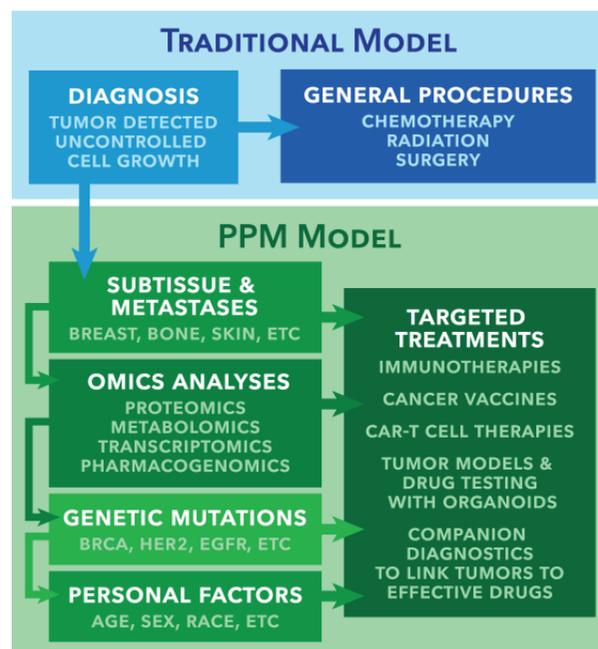

Figure 1: Traditional Versus PPM Model for Cancer Treatment. A comparison of the key differences in the traditional model of cancer treatment and the emerging PPM model. Traditionally, cancer has been treated using general, 'one size fits all' approaches such as chemotherapy, radiation, and surgical excision of tumors. These treatments vary widely in efficacy across individuals and also often cause harm to healthy, non-cancerous organs and tissues. The PPM approach is characterized by individualized treatments tailored to specific tissues, gene mutations, and personal factors relevant to each unique case of cancer. Companion diagnostics help identify which treatments will be most effective for a specific patient's tumor, and novel cell therapies are used to target the cancer with minimal damage to healthy tissues, making the PPM model more effective and safer.

A primary message of the paper is that PPM has the potential to transform cancer care (**Figure 1**). The traditional model is limited to tumor detection, followed by general treatment procedures such as surgery, chemotherapy, and radiation. In contrast, the PPM approach allows for targeted treatments, which are more effective and avoid unnecessary side effects. These treatments are identified by analyzing specific tissues, gene mutations and personal factors relevant to each unique case of cancer. Examples of such emerging treatments include immunotherapies, cancer vaccines, companion diagnostics, and more.

In addition, the authors addressed societal issues of PPM in healthcare. Although potentially transformative, a lot of difficult questions must be answered before PPM becomes part of standard cancer care. These include regulatory challenges, economic concerns and feasibility, and associated socioeconomic and privacy issues. Today, PPM technology exists and is rapidly becoming more efficient and sophisticated; however, these questions must be tackled in order to allow for the smooth integration of PPM into cancer care.

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