Editorial

The Application of High-Throughput Technologies in Precision Diagnosis and Personalized Therapy

With the development of the high-throughput technologies, such as Next Generation Sequencing (NSG) and deep learning analysis of images, precision medicine is no longer a dream and the early diagnosis of complex diseases, such as cancers and pulmonary diseases, become possible. Not only precision diagnosis but also precision treatment have achieved huge successes. The inhibitors of PD-1 (programmed cell death protein 1) has approved by the FDA can treat various cancers. The cancer types are irrelevant, only the mutation pattern matters. It revolutionizes the treatment of diseases.

With all these exciting developments of early and accurate diagnosis using liquid biopsy and personalized immunotherapy using targeted inhibitors, the underlying image analysis, sequencing analysis and statistical analysis are the foundation. In this special issue, we included precision medicine studies using various methods.

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Yu *et al*. studied the association between vitamin D receptor (VDR) genetic polymorphism and lung cancer risk. Four positions on VDR gene, namely ApaI (rs7975232), BsmI (rs1544410), FokI (rs10735810) and TaqI (rs731236), were investigated. ApaI and FokI showed no associations while BsmI and TaqI were associated with lung cancer risk [1].

Ru *et al*. evaluated the efficacy and toxicity of anti-PD1 to chemotherapy in patients with non-small-cell lung cancer. Among patients with advanced NSCLC, were observed greater survival benefit, with a favorable safety profile with anti-PD1 than with docetaxel [2].

Ruan *et al*. evaluated the efficacy and toxicity of bevacizumab plus chemotherapy compared with bevacizumab-naive based chemotherapy as second-line systemic therapy in people with metastatic colorectal cancer (CRC). Their results suggest that the addition of bevacizumab to the chemotherapy therapy could be an efficient and safe option for patients with metastatic colorectal cancer as second-line treatment and without increasing the risk of adverse event [3].

Xu *et al*. reported the rate of adverse event after 1-year follow-up of coronary artery disease (CAD) patients who received percutaneous interventions (PCI) treatment. The rates for target vessel failure (TVF), target vessel revascularization, target lesion revascularization, myocardial infarction and major adverse cardiac events were 8.5%, 4.1%, 4.2%, 2.0%, 8.7%, respectively. The results were useful for post PCI treatment adverse event prevention [4].

Guo *et al*. screened genes that were significantly associated with drug resistance of lung cancer patients. They constructed a diagnostic classification model using the expression level of five genes as the feature and the prediction accuracy reached 85% [5].

Yuan *et al*. enrolled 120 children who were hospitalized in The First Hospital of Huzhou between January and December 2016 for respiratory tract infection due to M. pneumoniae. Nearly 90% of the resistant M. pneumoniae strains showed A to G substitution at position 2063 of the 23S rRNA gene [6].

Xu *et al*. evaluated the serum ORM1 level in the resistance of EGFR-TKI and optimized the cut off value of ORM1 for the diagnosis of EGFR-TKI resistance. When compared to those before treatment, the AUC of serum ORM1 concentration was 0.880 ± 0.038 with sensitivity of 92.9% and specificity of 73.8% in the resistance group. The cutoff value of serum ORM1 was 1.778 µg/ml for advanced EGFR-positive LUAD and 1.723 µg/ml after resistance to EGFR-TKI [7].

Zhang *et al*. applied several advanced computational methods, such as minimum redundancy maximum relevance (mRMR), incremental forward search (IFS) and random forest (RF) to investigate cereal hull color at metabolic level. A total of 158 key metabolites were found to be useful in distinguishing white cereal hulls from colorful cereal hulls. Their results provided new insights into the molecular basis of complex traits [8].

Wang *et al*. developed a new computational pipeline to identify the Driver Mutation-Differential Co-Expresison (DM-DCE) modules based on dysfunctional networks across 11 TCGA cancers. Their study sheds light on both cancer-specific and cross-cancer characteristics systematically [9].

Cai *et al*. compared the modified transverse colostomy with conventional methods. The operation time of stoma construction was 34±10 minutes for the conventional method and 28±7 minutes for the modified method (P= 0.009). Patients with conventional transverse colostomy were remarkably more likely to experience parastoma hernia (P= 0.048) and stoma prolapse (P= 0.038). Overall, the modified transverse colostomy is a safe and effective diverting technique [10].

Wang *et al*. proposed a novel network embedding method, which can extract topological features of each drug combination from a drug network that was constructed using chemical-chemical interaction information retrieved from STITCH. Their support machine vector (SVM) classifier yielded a Matthews correlation coefficient (MCC) of 0.806 [11].

Zhu *et al*. analyzed the medical records and various data of patients with lymphocyte interstitial pneumonia (LIP). They found that the diagnosis of lymphocyte interstitial pneumonia (LIP) with high-resolution CT can increase the clinical diagnosis rate, reduce misdiagnosis and improve early detection [12].

Zhang *et al*. studied hemolymphangioma, a rare benign tumor. Early diagnosis of hemolymphangioma is difficult, because its symptoms can be imperceptible for a long time. A case of 30-year-old hemolymphangioma woman patient with 2 years of follow-up was reported and more understanding of hemolymphangioma was accumulated [13].

Hu *et al*. reported a rare case of esophageal cancer maxilla metastasis (ECMM) with the involvement of the right side of the soft palate and maxillary sinus. They explored the possible mechanisms and predictors of esophageal cancer metastasis [14].

With these studies, we hope that more and more people will realize the power of advanced analysis in precision medicine and utilize these methods in their practice.

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