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Advancing Precision Medicine in Kidney Diseases through Team Science and Public-Private Partnerships

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Objectives : Chronic Kidney Diseases (CKD) are complex and multifactorial affecting over 700 million people globally, resulting in significant morbidity and mortality. Despite the prevalence, current treatments fall short for many due to substantial disease heterogeneity. Even with identical diagnoses, clinical presentation and progression rates lack similarity. These challenges are magnified for those with rare kidney diseases where small patient numbers have, until recently, limited translational research for therapeutic development.
Methods : Some patients may be at a point in their disease course that molecular programs resemble other CKD. There is, therefore, a critical need for precision medicine approaches where treatments are tailored to underlying disease mechanisms. Interdisciplinary collaborations among basic, translational, computational scientists, bioinformaticians and statisticians in systems biology have been successful in delineating underlying disease mechanisms. For example, applying multi-omics data integration to developing patient-specific biomarkers for clinical practice necessitates successful team science.
Results : Strategies using genomics, transcriptomics and proteomics data to stratify patients based on their disease mechanisms in rare nephrotic syndrome cohorts like Nephrotic Syndrome Study Network (NEPTUNE) and Cure Glomerulonephropathy (CureGN) are now in place. Using this knowledge base to inform new therapeutic development requires advanced collaborations amongst persons with wide-spanning expertise in biomarker discovery and clinical trial design, both in public and private sectors. Public-private partnerships (PPP) have not only enhanced our understanding of kidney diseases but driven innovation in clinical trial frameworks, particularly for rare diseases defined by small patient populations.
Conclusions : Collaborations between community stakeholders, healthcare providers, and researchers is vital to transform research and clinical trial findings into healthcare solutions. Successful, unique models of PPP will be presented to highlight advances and challenges of each. Precision medicine in kidney diseases demands harmonizing efforts across a plethora of disciplines. Team science and successful PPP can bridge gaps in knowledge, improve patient outcomes, and achieve transformative advances in nephrology.