Preface

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Editor

Having run a research laboratory for fifteen years with an emphasis on studying the role of regulatory costimulatory molecules in transplantation tolerance and witnessing tremendous growth in this field, as a guest editor for this issue of the *Clinics in Laboratory Medicine*, I instinctively chose to highlight advancements in the field of novel molecules and biomarkers in transplantation.

The focus during a transplant is to promote allograft tolerance and avoid allograft rejection. The article by Allos and colleagues on regulatory T cells, which have strong immunosuppressive characteristics, covers our evolving understanding of these cells and their inclusion in clinical trials. The article in this issue by Cherukuri and colleagues elegantly covers the regulatory B cells, which, through expression of immune-modulatory cytokine interleukin-10, can contribute to allograft acceptance and are showing great potential as a biomarker.

The article by Horwitz and colleagues on complement provides a remarkable description of the different mechanisms of complement-mediated injury and discusses the therapeutic role of complement inhibitors in solid organ transplant recipients. These studies tie in nicely with the article by Timofeeva on utilizing donor-specific antibodies, especially the ones with complement binding capabilities, as a biomarker for rejection of grafts. Using the 2014 National Institutes of Health consensus on biomarker criteria, Rowan and Paczesny describe Stimulation 2 to be the most validated and promising therapeutic target for acute graft-versus-host disease following stem cell transplantation. New emerging markers for solid organ transplant, such as measurement of donor-derived cell-free DNA and kidney solid organ response test, have been described in the article by Choi and colleagues. The article by Uehara and McGrath outlines the impressive growth in our understanding of the mechanisms by which costimulatory molecules modulate alloreactive T cells, leading to long term transplant tolerance. The following article by Jindra and Cusick describes gene variants in costimulatory molecules and cytokines, which could help to identify patients at risk and design more effective immunosuppressive regimens.

The article by Khan and colleagues presents an excellent description of the emerging role of miRNAs as robust biomarkers for assessing transplant outcomes

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following kidney transplantation. The miRNAs, along with exosomes, are expected to evolve as biomarkers for assessing transplant rejection in other organs also. Interestingly, these biomarkers have also shown promise in predicting pregnancy disorders, as discussed in the article by Tripathi and Guleria on fetomaternal tolerance.

New developments in immunosuppressive agents that target T cells, B cells, plasma cells, and complement are outlined in the article by Shin and colleagues. It is hoped that these innovations will result in development of new safer alternatives that will supplant older immunosuppressive agents, including the commonly used calcineurin inhibitors that are associated with toxicity. Signaling molecules and molecular mechanisms involved in immunosuppressive agent-induced posttransplant cancer development are summarized in the article in this issue by Balan and colleagues.

Microbiota and their role in various human diseases is a fast developing area, and the article by Rey and Choy suggests a regulatory role for gut microbiota and discusses how this microbial community may affect organ transplant rejection.

I am very thankful and appreciative to all the leading experts in the field of solid organ and stem cell transplant, some of whom I have collaborated with in the past, who agreed to contribute an article for this issue.

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