

## Biomarkers for Early Detection of Post-Transplantation Rejection

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### Abstract

Although transplantation is one of the major medical achievements of the last half century, the shortage of organs and need for long term immunosuppressive therapy limits its usefulness. Advances in stem cell therapy has the potential both to overcome the shortage of organs but also to provide novel ways of reintroducing a tolerogenic state in patients who require life saving transplantation therapy.

Understanding mechanisms of rejection which involve both innate and adaptive immunity would allow for novel therapeutic approaches to eliminate or avoid the use of toxic immunosuppressive agents. The evolving era of functional genomics in organ transplantation has been supported by advances in gene profiling, sequencing, proteomics, antibody profiling and bioinformatics. Thus, heralding a new era of intelligent and personalized monitor and therapy. Molecular and cell based biomarkers and now

emerging which may be useful to monitor the immune status of the patient and it is anticipated that over the next several years these will detect rejection for immune events before a transplanted organ or cell is damaged. Patterns of genomic biomarkers are also being developed which may predict patients, who achieve tolerance which may not only be useful in the setting of transplantation, but also in patients with autoimmune disease. The ultimate goal of future studies will be to identify markers with sufficient predictive value to improve graft survival, limit graft injury from under immunosuppression and reduce patient morbidity from over immunosuppression.

These approaches will also be critical for successful stem cell therapy where it is known that immunologic barriers limit its adoption.