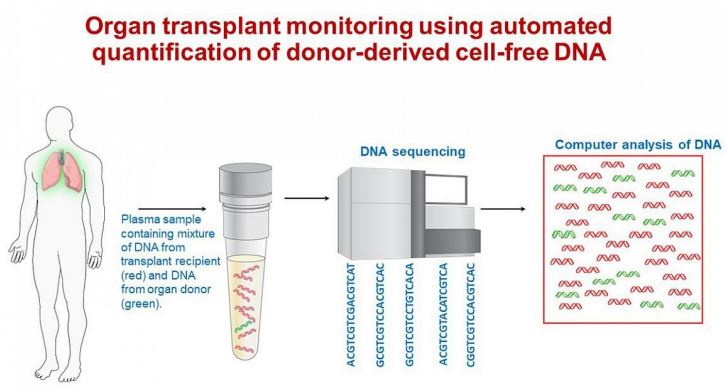
BioSpectrum
the business of Bi
24 years of leveraging the business of Bio
www.biospectrumindia.co

Blood test shows early detection of lung-transplant rejection: NIH

25 January 2019 | News

Researchers believe this same test might also be useful for monitoring rejection in other types of organ transplants



Researchers at National Institutes of Health have developed a simple blood test that can detect when a newly transplanted lung is being rejected by a patient, even when no outward signs of the rejection are evident. The test could make it possible for doctors to intervene faster to prevent or slow down so-called chronic rejection—which is severe, irreversible, and often deadly—in those first critical months after lung transplantation.

Researchers believe this same test might also be useful for monitoring rejection in other types of organ transplants. The work was funded by the National Heart, Lung, and Blood Institute (NHLBI), part of the National Institutes of Health. The study's findings were published Jan. 22 in EBioMedicine, a publication of The Lancet.

Hannah Valantine, M.D., co-leader of the study and lead investigator of the Laboratory of Organ Transplant Genomics in the Cardiovascular Branch at NHLBI said, "This test solves a long-standing problem in lung transplants: detection of hidden signs of rejection. We're very excited about its potential to save lives, especially in the wake of a critical shortage of donor organs."

The test relies on DNA sequencing, Valantine explained, and as such, represents a great example of personalized medicine, as it will allow doctors to tailor transplant treatments to those individuals who are at highest risk for rejection.

Lung transplant recipients have the shortest survival rates among patients who get solid organ transplantation of any kind—only about half live past five years. Lung transplant recipients face a high incidence of chronic rejection, which occurs when the body's immune system attacks the transplanted organ.

Existing tools for detecting signs of rejection, such as biopsy, either require the removal of small amounts of lung tissue or are not sensitive enough to discern the severity of the rejection. The new test appears to overcome those challenges.

Called the donor-derived cell-free DNA test, the experimental test begins with obtaining a few blood droplets taken from the arm of the transplant recipient. A special set of machines then sorts the DNA fragments in the blood sample, and in combination with computer analysis, determines whether the fragments are from the recipient or the donor and how many of each type are present. Because injured or dying cells from the donor release lots of donor DNA fragments into the bloodstream compared to normal donor cells, higher amounts of donor DNA indicate a higher risk for transplant rejection in the recipient.

In the study, 106 lung transplant recipients were enrolled and monitored. Blood samples collected in the first three months after transplantation underwent the testing procedure. The results showed that those with higher levels of the donor-derived DNA fragments in the first three months of transplantation were six times more likely to subsequently develop transplant organ failure or die during the study follow-up period than those with lower donor-derived DNA levels. Importantly, researchers found that more than half of the high-risk subjects showed no outward signs of clinical complications during this period.

"We showed for the first time that donor-derived DNA is a predictive marker for chronic lung rejection and death, and could provide critical time-points to intervene, perhaps preventing these outcomes. Once rejection is detected early via this test, doctors would then have the option to increase the dosages of anti-rejection drugs, add new agents that reduce tissue inflammation, or take other measures to prevent or slow the progression", Valantine added.

This research is supported by The Genomic Research Alliance for Transplantation Study, which is funded by the Division of Intramural Research of NHLBI. The research is also supported by The Genome Transplant Dynamics Study, which is funded by the National Institute of Allergy and Infectious Diseases.