

Genomic blood test predicts survival rates after surgery for advanced heart failure

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An experimental blood test developed at UCLA that uses gene activity data from immune cells was 93 percent accurate in predicting survival rates for people with advanced heart failure who had surgery to implant mechanical circulatory support devices.

Mechanical circulatory support devices, such as [ventricular assist devices](#) and temporary total artificial hearts, can be surgically implanted in people with advanced [heart](#) failure to help the heart's pumping function. But people with advanced heart failure often also suffer from multi-organ dysfunction syndrome, which can lead to death after a device is implanted and is associated with atypical white blood cell activity. When [patients](#) and doctors are considering a mechanical assist device, current clinical methods used to predict treatment results have limitations: They do not perform well in very sick patients and they do not use molecular information. That lack of precision in predicting treatment outcomes can complicate the shared decision-making process between patients and their doctors. Dr. Mario Deng, the study's principal investigator, was also a co-developer of an FDA-approved molecular blood test called AlloMap, which is used to diagnose organ rejection in [heart transplant recipients](#). The technology used in the new study, called MyLeukoMap, builds on the methods used in developing AlloMap.

The study involved 29 people with advanced heart failure who underwent [mechanical circulatory support surgery](#) at UCLA from 2012 to 2014. Researchers collected blood samples one day before surgery and took clinical data both before surgery and eight days afterward. The

patients were classified into two groups depending on their level of organ function. Seventeen patients showed improvement and 12 did not. One year later, 88 percent of the people in the "improved" group were still alive, compared with 27 percent in the other group. The researchers identified a set of 28 genes from the pre-surgery blood samples that predicted how well the patients' organ function would recover shortly after surgery—and of those 28 genes, 12 helped predict whether organ function would improve after surgery and in forecasting whether the patients would live at least a year after the surgery.

The researchers hope to study whether the test can also be used to accurately predict how people with advanced heart failure and declining [organ function](#) will fare after undergoing other types of heart surgery and catheter-based interventions. The test also could help patients and doctors make more informed decisions about treatment options—if it predicts a poor outcome, patients could choose to postpone surgery until their condition improves or could opt for another course of treatment. Ultimately, it could improve [survival rates](#), and the quality and cost-effectiveness of care. In the next phase of the study, researchers will expand the research to analyze results for 1,000 patients from 10 sites in the U.S. and around the world.

The study was published Dec. 13 in the Journal *PLOS ONE*.

Provided by University of California, Los Angeles

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