A systems BIOlogy Study to TAilored Treatment in Chronic Heart Failure

Results in Brief

Predictive biomarkers for chronic heart failure

Effective chronic heart failure treatments should be patient-specific. A European study of individual patient biomarkers from over 4 000 patients has provided clues as to why current recommended therapy sometimes has a poor outcome.

HEALTH

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Heart failure, like many other diseases, represents a set of different ailments, each requiring special medication. Same drugs that could be highly beneficial for one group of patients would have limited effect on another. The BIOSTAT-CHF (A systems biology study to tailored treatment in chronic heart failure) project has identified molecular biomarkers for 'non-responders'.

The study enrolled patients with signs of worsening heart failure after initial stabilisation from over 60 hospitals in 13 European countries. Their treatment was optimised according to the heart failure guidelines of the European Society of Cardiology with diuretics, angiotensin-converting-enzyme (ACE) inhibitors, beta blockers and aldosterone antagonists.

Data and samples from before and after the treatment that were deemed suitable for genomic and proteomic biomarker identification were collected. The team developed

protocols for biomarker analysis and handling logistics of sample shipment and storage.

Novel candidate biomarker molecules were studied such as angiogenin, osteopontin and neuropilin. Out of some 800 000 variants, genome wide association study helped identify the variants that could possibly contribute to clinical response of patients. One on chromosome 11 shows a significant association at genome-wide level.

A risk prediction model for clinical outcome of patients with heart failure was developed based on the proteomics analysis. Models predicted mortality, hospitalisation and both events together.

The BIOSTAT-CHF consortium will provide a far more detailed and advanced risk model for heart failure patients than that currently available. This is very important since the envisioned personalised treatment will result in less medication, leading to a significant reduction in health care costs.

BIOSTAT-CHF has provided a model that predicts response to therapy, incorporating demographics, biomarkers, genome-wide analysis and proteomics. Due to the sheer size of the trial, the extensive data collection and continued analysis, the bulk of information significant in the clinic has yet to be realised. Identification of patients who are poor responders may well lead to the development of targeted therapies for heart failure.

Keywords

Biomarkers, chronic heart failure, genomic, proteomic, targeted therapies

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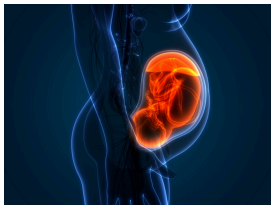

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