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Recent advances in EMB Diagnostics

The most common cause of death in Western European Countries are cardiovascular diseases. By estimation of the European Society of Cardiology (ESC) 12 million patients in Europe are suffering from heart failure problems, 3 million patients are showing dilated cardiomyopathy (DCM). Cardiomyopathies arise mainly from inflammation and infections with bacteria or cardiotropic viruses.

Current state-of-the-art in EMB Diagnostics is a combination of histological staining for diagnosis of active myocarditis or storage diseases, immunohistochemical staining with specific antibodies and digital imaging analysis for quantitative evaluation of intramyocardial inflammation and the molecular biological detection of cardiotropic viruses. Viral infections of the myocardium are considered to be a main cause for the development of DCM. The qualitative detection of most relevant cardiotropic viruses (Adenovirus, Enterovirus, Epstein-Barr-Virus (EBV), Erythrovirus (B19V), Human Herpesvirus 6 (HHV6)) should be supported by sequencing, quantification of viral load and measurement of transcripts (mRNA) as marker of viral activity, especially for B19V and HHV6. Digital numeric quantifications of inflammatory infiltrates in myocardium has shown a close correlation with clinical course and mortality. Number of cytotoxic cells (Perforin) in initial EMB is predictive for worse progression of LV function in examined patients. The increasing number of T memory cells (CD45RO) in EMB results in significantly increasing mortality in a 10-year follow-up. High number of inflammatory cells in virus-negative patients request the immediate immunosuppressive treatment to prevent myocardial injuries and failing heart. In virus-positive patients an antiviral therapy is indicated.

Due to focal pathology, diagnostics are failing if the EMB does not contain the area of interest. Therefore at least 8 EMBs should be taken. Biopsies from left or right ventricle are equally meaningful. The chance that the sampling error occurs are much likely if only very few biopsies will be analysed. However, first investigations indicate that the presence of individual gene expression patterns (mRNA) of myocardial tissue can be used for identification of specific disease situations without proof of histological or virological markers in the examined myocardial tissue. These disease specific profiles will be changed during effective treatment and thereby could be applied for therapy monitoring.

Personalized medicine comprises the genetic information together with the phenotypic and environmental factors to yield a tailored healthcare for each individual and removes the limitations of the "one-size-fits-all" therapy approach. Novel biomarkers and multiparametric approaches in expanded EMB diagnostics provide the opportunity to translate therapies from bench to bedside, to diagnose and predict disease, and to improve patient-tailored treatments based on the unique signatures of a patient's disease.

Biography

Dirk Lassner is in the Management and Laboratory direction (GLP/GCP, College of American Pathologists (CAP)), Acquisition, Marketing and Sales Management of diagnostic and CRO service (trials, gene chips), Biochemist/Molecular biologist (RT-PCR, QPCR, gene arrays, sequencing, SNP technology), Cell biologist (cell culture, flow cytometry, in-situ techniques (hybridization, PCR, antibodies)), International co-operations in research and molecular diagnostics in cardiology. He is the Managing and Laboratory Director of InstitutKardialeDiagnostik und Therapie GmbH (IKDT), Berlin since 2003, Permanent collaboration and participation in several national and international R&D projects with Dept of Cardiology, Charite University Hospital Berlin since 2003, Managing Director of AugustusburgBioTech GmbH, 2001 to 2002. He has done his PhD (Dr. rer.nat.) at University Leipzig – magna cum laude in 1996.He has over 50 publications on cardiomyopathies and different patent applications.

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