18HLT10: CardioMet

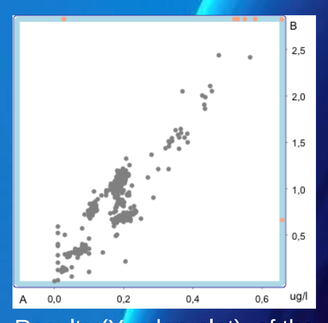
Providing the measurement infrastructure to allow quantitative diagnostic methods for biomarkers of coronary heart diseases

Need

- Cardiac diseases, with 11.3 million new cases and 1.8 million deaths per year, are one of the main challenges for health care in the EU
- Estimated to cost the EU economy: € 210 billion per year
- Quantification of cardiac biomarkers for diagnosis is very difficult and challenging, the residual risk of undiagnosed cases is high and can be lethal
- Regulation (EU)2017/746 requires the metrological traceability of medical test results
- Large between-methods variability due to a lack of reference methods / traceability chains

Objectives

- To develop reference measurement procedures for the quantification of proteins, which act as biomarkers for coronary heart diseases, traceable to SI
- To develop a reference measurement procedure for the quantification of biomarkers for heart failure traceable to SI
- To develop fast, selective and highly efficient enrichment methods to achieve the required low LOQ.
- To develop fast and quasi-continuous monitoring of cardiac biomarkers via quick tests or biosensor probes
- To work closely with clinical reference laboratories, *in vitro* diagnostics (IVD) producers and relevant national clinical associations



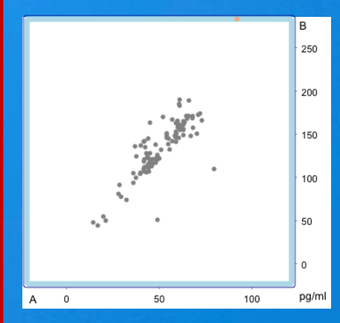
Results (Youden-plot) of the survey for cardiac troponin I coordinated by RfB for German clinical laboratories (CM3/18)

WP1: Biomarkers used in patient stratification and long term CVD risk assessment

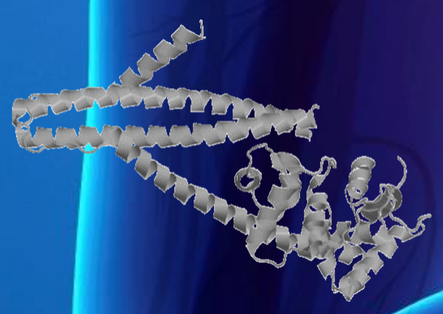
- Defining metrology needs for estimating risk
- Towards worldwide standardisation of apolipoprotein measurements based on IDMS and definition of standardised reference ranges
- Performance specification of advanced lipoprotein testing methods in CVD risk assessment and patient stratification

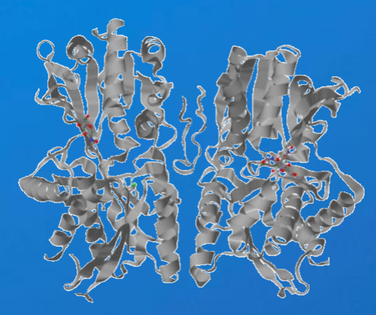
WP2: Biomarkers for acute myocardial infarction

- Production of reference and spike material
- Development of a suitable quantification method
- Method validation
- Development of a biosensor for the quasi-continuous monitoring of cardiac biomarkers
- Application to patient samples



Results (Youden-plot) of the survey for BNP coordinated by RfB for German clinical laboratories (CM3/18)





WP3: Biomarkers for acute and chronic heart failure

- Reference measurement procedure for NT-proBNP
- Application of reference measurement procedure for NT-proBNP to EQA schemes
- Understanding issues for 1-32 BNP measurements in clinics

State of the art

- Quantification of the biomarkers mainly with immune assays
- Often target within the protein not known and, thus, analyte poorly defined
- Only for cTnI potential reference measurement procedure published by NIST, however with far too high LOQ

Impact

- Close exchange with IFCC: guidance from the IFCC Scientific Division and direct support of activities of IFCC WG-ApoMS
- Dissemination through JCTLM
- Knowledge exchange with NIST
- Partner from LUMC chairs EFLM WG on laboratory test evaluation
- Close cooperation with national EQA scheme providers from Germany and UK
- Creating synergies between work of CardioMet and SFBC WG-LDLc
- Input of the results to the CRML Network
- Support accreditation through COFRAC
- Close link to the European Metrology Network on Traceability in Laboratory Medicine

Stakeholders

Standardisation and public bodies

- International Federation of Clinical Chemistry and Laboratory Medicine (IFCC)
- Joint Committee for Traceability in Laboratory Medicine (JCTLM)
- Centers for Disease Control (CDC)
- American Association for Clinical Chemistry (AACC)

EQA providers

- Referenzinstitut für Bioanalytik (RfB)
- UK NEQAS
- EQUALIS

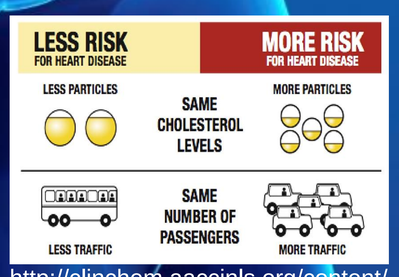
Hospitals and universities

- National Heart, Lung, and Blood Institute (NIH)
- Société Francaise de Biologie Clinique (SFBC)
- Universitätsklinikum Heidelberg
- Northwest Lipid Metabolism and Diabetes Research Laboratories, University of Washington

Industry

- Promise Advanced Proteomics
- HyTest
- LabCorp

and others



http://clinchem.aaccjnls.org/content/64/10/1485

⇒ 50 % of heart attack victims had normal cholesterol levels

Wider Impact

- Earlier diagnosis of heart infarction due to more sensitive and reliable measurement procedures for cTn
- Decrease in mortality due to earlier diagnosis of heart failure supported by sensitive and reliable methods for the quantification of the BNPs
- Successful prevention strategies supported by reliable risk assessment and patients stratification using apolipoproteins as biomarkers
- Long-term: sensor for self-tests for high-risk patients

Consortium

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