

DoReMi
Integrating Low Dose Research

DoReMi TRA position meeting

Biomarkers – Biodosimetry

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Overview and basis

- Pernot et al. 2012

Overview of biomarkers of exposure, of susceptibility, late effects, and disease

- Kreuzer et al. (accepted)

Low dose radiation and cardiovascular diseases
strategies for molecularepidemiological studies in Europe

Biomarkers for cardiovascular diseases

- Assays and biomakers used in WP5-7
- Biomarkers used in other projects



General aspects

- Huge amount of existing markers and assays
- Need for more/better biomarkers
- Active identification of biomarkers/ assay /approaches
 - Pool for identification: outcome of „omics“ approaches, pathways, networks, models
 - „multidisciplinary“ scanning where to look for new/better markers
- **„Biomarker discovery“**
- But:
not to underestimate established biomarkers/assays



Quality assurance of biomarkers / assays

Publication usually show results or give an overview of biomarkers, but mostly do not address critical detailed aspects as:

- how to properly handle them
- Critical points, influence factors if known at all (e.g. MN-“storage“)
- New techniques – new challenges
e.g. -omics approaches
very challenging in handling the data and the technique



Quality assurance of biomarkers / assays

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- how to properly handle them
- Critical points, influence factors if known at all (e.g. MN-“storage“)

Conclusion:

- Critical evaluation of existing biomarkers needed
- Validation process of „new“ emerging biomarkers needed

Quality assurance of biomarkers / assays

- Critical look at use of biomarkers and the set up of study design
e.g. different challenges: Robustness? Sensitivity? Specificity?
- all aspects have to be considered:
including biology
small-/large-scale study
biomathematics
epidemiology
modelling
logistics if appropriate

Example: Study design

- e.g. markers for individual person - groups of persons
- Controlled setup: use of „sensible“ biomarkers is possible
- If many variables to be considered: robust biomarkers necessary
- Scale of the study: small, large-scale

!! still often underestimated, therefore



Quality assurance of laboratories

- Including again all aspects
e.g. interdisciplinary approaches
- option: intercomparisons

always possible?

discussion yesterday on omics-approaches!

Mandatory: QA & QM, E&T

Assurance of reliable results

- Harmonisation / standardisation of procedures
- Harmonisation of partner laboratories

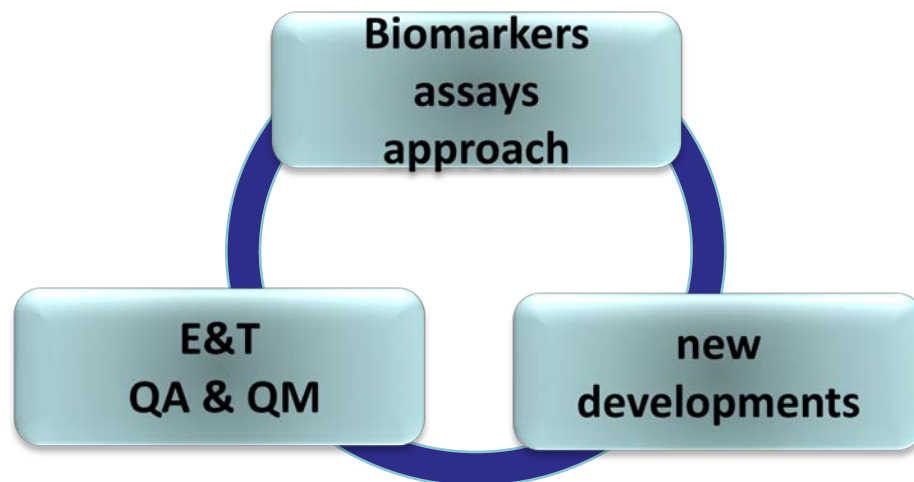
e.g. , including aspects as:

- ✓ *shipment*
- ✓ *culturing*
- ✓ *preparation and staining*
- ✓ *analysis/scoring*
- ✓ *dose estimation*



Basis for reliable results

crucial for the use of biomarkers and reliable results:



Connected to each other!

QA & QM programme

- For known biomarkers
- For „new“ and emerging biomarkers
 - including all aspects
 - involvement of all necessary disciplines:
biology, biomathematics, also epidemiology, modelling, medicine, ...
 - Careful planning of surrounding factors: logistics, shipment, hardware, ...

QA &QM: more aspects

- Storage of samples
- Storage of data
- Large scale events
- Access to data, raw data
(„chromotrypsis“)



Lessons learned

- Standardisation and harmonisation of procedure is not sufficient
- Findings in the projects have to be validated
 - Panel of biomarkers
 - Panel of approaches
In vitro , in vivo



Biodosimetry

- Experience from biodosimetry in accident situations
- Small-scale accident – large scale accident
 - Adaption of strategy
 - Classification, preliminary results
 - Analysis of pictures
 - networking
 - Adaption of techniques
 - Automation



Biodosimery

- Establishment of a QA & QM programme
 - QA & QM manual including shipment, storage of samples, preparation, staining, analysis, statistical analysis
 - intercomparisons
- Establishment of E&T activities
 - exchange of scientists (based on needs, identified in intercomparisons)
 - Seminars: best lab praxis, statistics, ISO standards

Biodosimery

Large-scale studies and events:

- Networking aspects in the QA&QM and E&T:
 - Inclusion of new markers
 - Inclusion of new members for



Conclusuion

- QA & QM of biomarkers/ laboratories is of utmost importance
- E&T very necessary
- These approaches are not for free but sustainability is needed
- Options:
 - Inclusion in infrastructure
 - Inclusion in E & T



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Sitges, 29.04.2015