Biomarkers for Duchenne muscular dystrophy

Annemieke Aartsma-Rus
(on behalf of Alessandra Ferlini, University of Ferrara, Italy)
• Serum biomarker requirements
  ▪ Robust
  ▪ Validated in well defined patient cohort
  ▪ Should mirror defined clinical outcome measures or be predictive of clinical benefit in the future

• Serum biomarkers in DMD
  ▪ Several papers reported discovery of candidate biomarkers
  ▪ Majority identified in animal models or single patients
  ▪ A few also tested in patient cohorts
  ▪ Work in progress
Biomarker development

• Discovery
  ▪ Animal models and patient cohorts

• Technical validation
  ▪ Reproducibility, sensitivity etc

• Functional validation
  ▪ Larger cohorts
  ▪ Response to treatment

• Regulation
Work in progress 1: MMP9

- Serum MMP9 levels higher in *mdx* mouse, BMD and DMD patients compared to age matched controls
- MMP9 levels increase with disease progression in DMD patients
- MMP9 exploratory marker in PRO-045 trial and Sarepta trial
Work in progress 2: Serum myoMIRs

• Muscle-specific miRNAs (miR-1, miR133, miR 206)
• Increased levels reported for *mdx* mouse and DMD patient serum
• Normalizes after exon skipping in *mdx* mouse model
• Only small patient cohorts studied
• Further validation needed
miR-1, miR-133a and miR-206 serum levels are elevated in *mdx* vs wild type and normalize after exon skipping.
Future perspective

- More work needed
- Candidate validation
- Discovery
  - Not all candidates will be validated
- Stakeholder meetings
  - Jan 24-26 ENMC workshop on serum biomarkers
  - Academics, Industry and patient organizations
  - COST Action allows for further meetings
  - Similar efforts also ongoing for other surrogate markers (e.g. MRI)