



Real-time PCR Data Markup Language

A new standard for archiving and exchanging real-time PCR data

Steve Lefever

On behalf of the RDML consortium



qPCR = golden standard for nucleic acids quantification

Dedicated and precise instruments needed



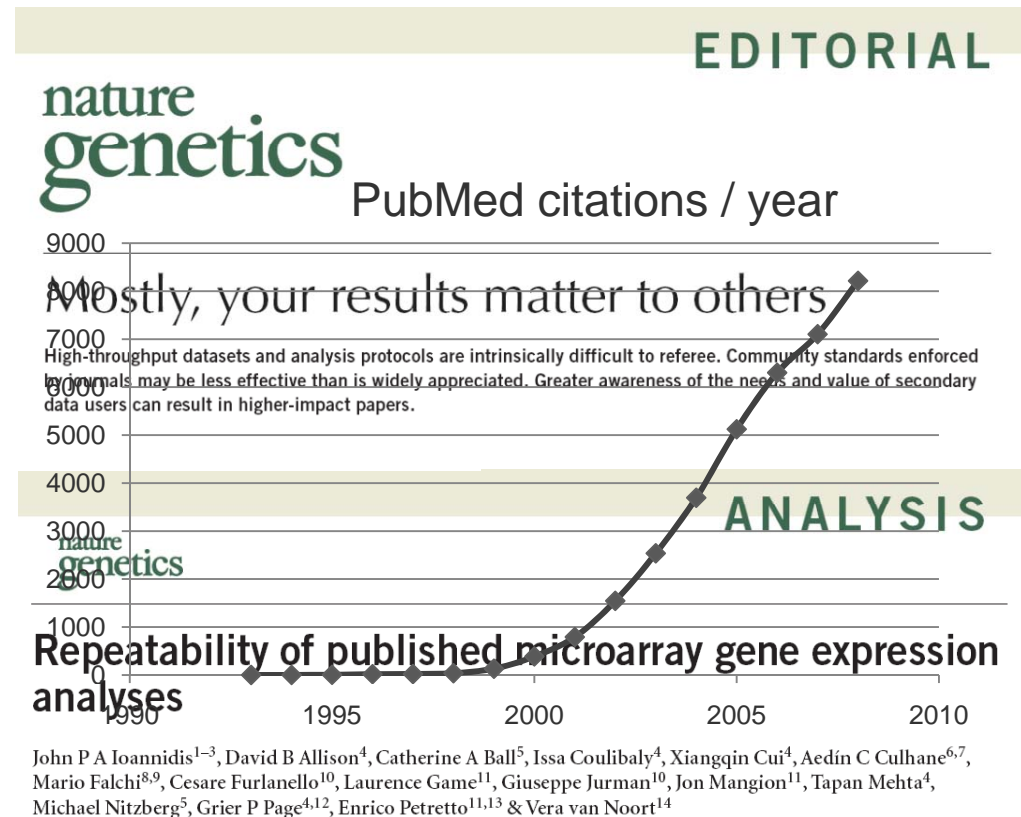
Different software/output format
for each instrument/manufacturere



Limits possibility to exchange and
reanalyse data



RDML





- Birth on September 1st 2005 – Jan Hellemans
- 2005 – 2007 : Open discussion about RDML
- January 1st 2008 : start of the RDML consortium
- April 1st 2008 : RDML joins MIBBI
- January 12th 2009 : RDML paper accepted in Nucleic Acid Research

Nucleic Acids Research, 2009, 1–5
doi:10.1093/nar/gkp056

SURVEY AND SUMMARY

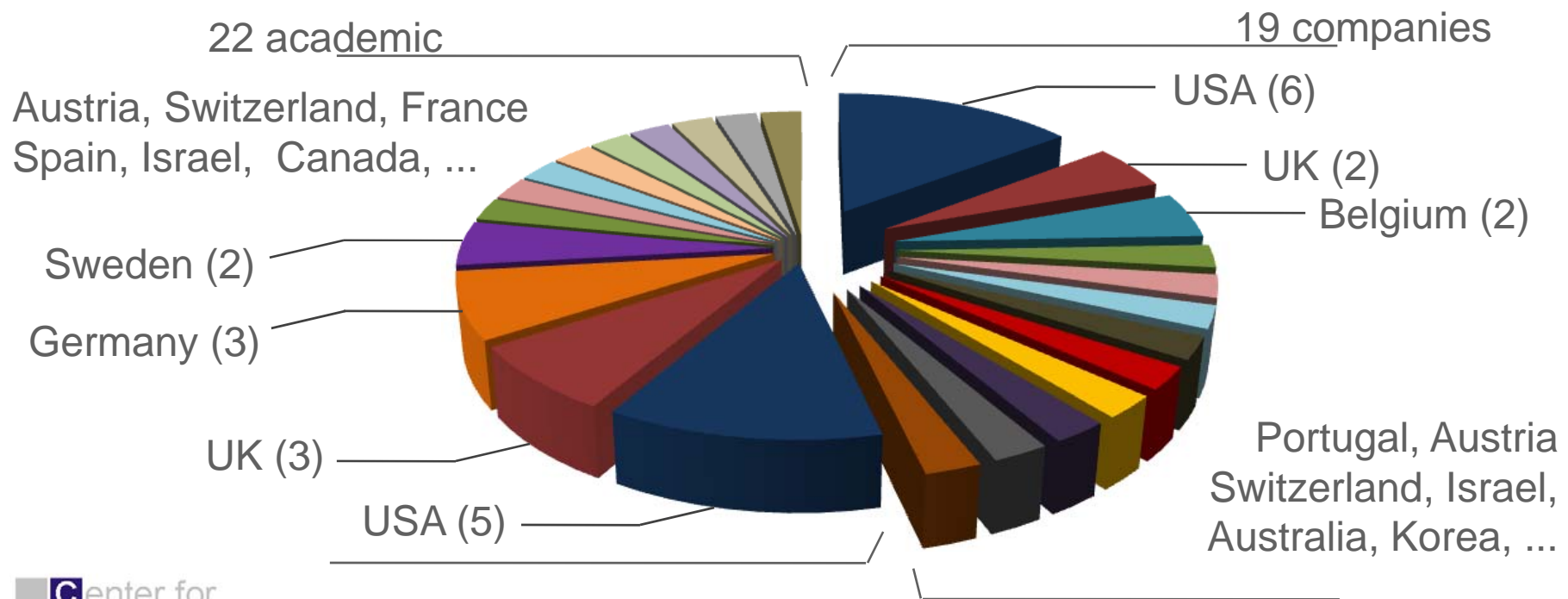
RDML: structured language and reporting guidelines for real-time quantitative PCR data

Steve Lefever¹, Jan Hellemans^{1,*}, Filip Pattyn¹, Daniel R. Przybylski², Chris Taylor³, René Geurts⁴, Andreas Untergasser⁴ and Jo Vandesompele¹, on behalf of the RDML consortium

▶ RDML consortium



- Develops and maintains the RDML data exchange format
- Key developer group, a member community and supporters
- 41 supporters and members from 20 different countries





- Minimum Information for Biological and Biomedical Investigations
- <http://www.mibbi.org>
- Published in August 2008 by Nature Biotechnology

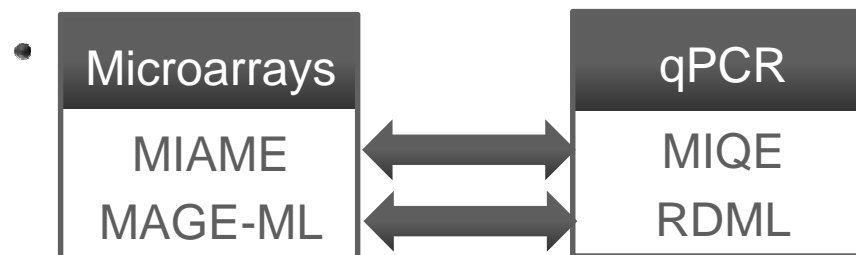


_computational
BIOLOGY

COMMENTARY

Promoting coherent minimum reporting guidelines for biological and biomedical investigations: the MIBBI project

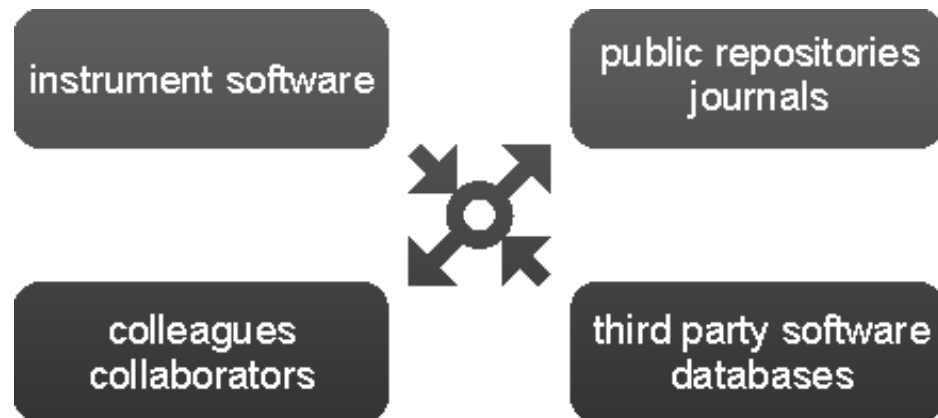
- RDML adopted as standard for qPCR experiments



▶ What is RDML?



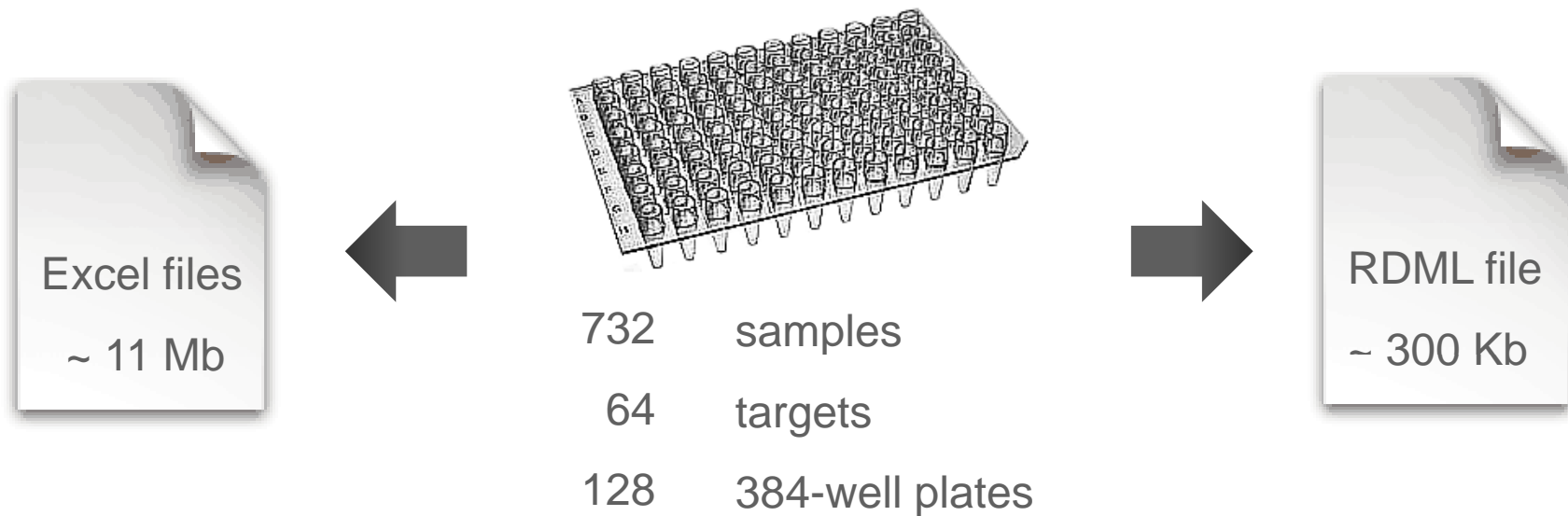
- RDML = Real-time PCR Data Markup Language
- Universal format to store and exchange qPCR data
- Structured
- Based on XML
- Platform independent
- Easy to extend
- Small RDML files



▶ What is RDML? ▶ File size reduction



- Vermeulen et al.
- Prognostic gene study in neuroblastoma



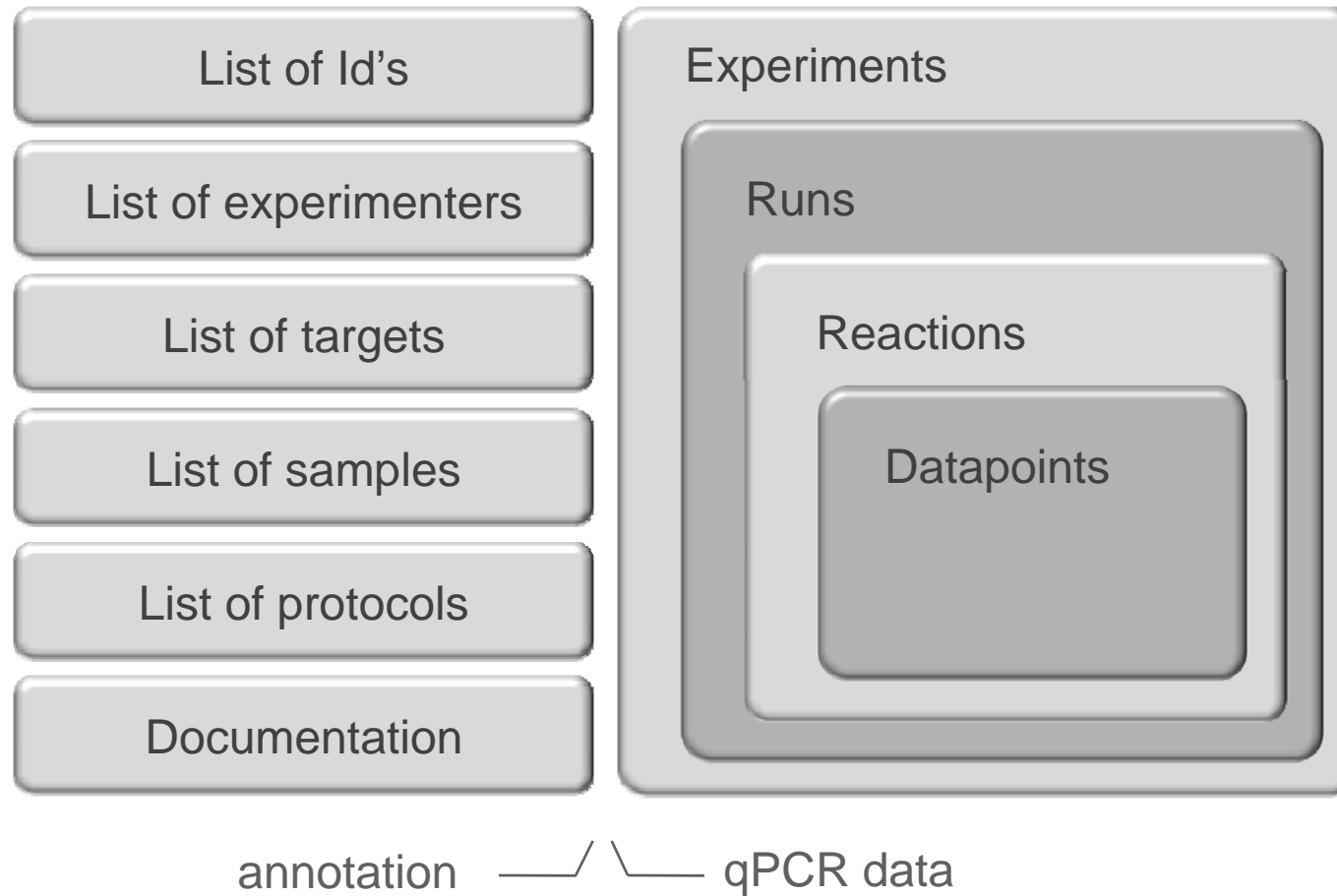
▶ What is XML?



- eXtensible Markup Language
- Language to store data in a structured manner
- Defines elements delimited by opening and closing tags
- Easily extensible

```
<gene>  
  <symbol>actb</symbol>  
  <function>muscle contraction</function>  
  <location>chromosome 7: 5533308-5569941</location>  
</gene>
```

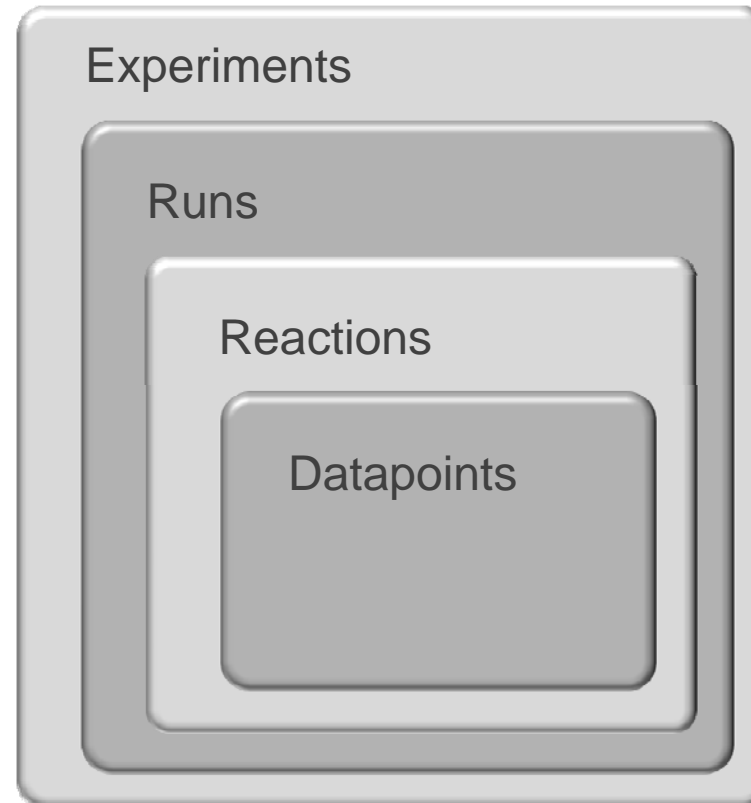

▶ RDML structure



▶ RDML structure



- qPCR data
- Experiment annotation
- Multiple experiments per file
- Standard vocabulary (MIQE)
 - reaction
 - Cq





List of Id's

List of experimenters

List of targets

List of samples

List of protocols

Documentation

- Accession numbers for online repositories or journals



List of Id's

List of experimenters

List of targets

List of samples

List of protocols

Documentation

- Contact information of experimenters



List of Id's

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Documentation

- Target annotation
- Oligonucleotide sequences

▶ RDML structure



List of Id's

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Documentation

- Sample annotation
- cDNA synthesis

▶ RDML structure



List of Id's

List of experimenters

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Documentation

- Any type of protocol

▶ RDML structure



List of Id's

List of experimenters

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List of samples

List of protocols

Documentation

- Additional information

▶ RDML supporting software



- Under development:

- **Primer3Plus**

- RDML viewer and editor



- More to come



Real-time PCR Data Markup Language

Home | News | Data Standard | Development | MIQE | Tools | Consortium

Tools

- Create RDML file
- Validate RDML file
- Browse libraries

Join or support

The Real-time PCR Data Markup Language (RDML) is a structured and universal data standard for exchanging quantitative PCR (qPCR) data. Together with the accompanying RDML guidelines, the data standard should contain sufficient information to understand the experimental setup, re-analyse the data and interpret the results. The data standard is a flat text file in Extensible Markup Language (XML) and enables transparent exchange of annotated qPCR data between instrument software and third-party data analysis packages, between colleagues and collaborators, and between authors, peer reviewers, journals and readers. To support the public acceptance of this standard, both an on-line RDML file generator is available for end users, as well as RDML software libraries to be used by software developers, enabling import and export of RDML data files.

instrument software public repositories journals

colleagues collaborators third party software databases

Contact : info@rdml.org © 2008 RDML Consortium

- www.rdml.org
- Tool for creating RDML files
- Tool for converting RDML file to .csv files
- Libraries in Java, C, .NET and PHP



- Online generation of an RDML file
- Importing the RDML file in qBasePlus for analysis
- Convert RDML file into .csv files

▶ Conclusion



- Data standard for qPCR data
- Universal and extensible
- Easy exchange of data
- Broad acceptance by community
- Submit data in RDML format to journals
- www.rdml.org



- The RDML consortium
- Jo Vandesompele
- Jan Hellemans
- Filip Pattyn
- Andreas Untergasser
- Daniel Przybylski