An informed way to manage information

OpenLAB

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Laboratory Data Collection, Analysis, Interpretation and Management
Agenda

Overview of OpenLAB (CDS, ELN, ECM)
OpenLAB CDS Remote Control (AIC)
OpenLAB Collaboration (remote access)
OpenLAB Demo
Wrap up and Questions
Challenges for Laboratories

- Record Keeping - Paper
- Data Overload
- Access to Data and Instruments (remotely)
- Collaboration

- Regulatory Compliance (CLIA, 21CFRpart11, CBER…)
- IP Protection
- Data Integrity
- Turn Over in labs (training)
- Multiple Sources of Data and Instrumentation
Agilent OpenLAB Laboratory Software Suite

**OpenLAB CDS**
Chromatography Data System
Workstation, Networked, Distributed
- ChemStation, EZChrom workflows
- Agilent and Non Agilent Instrument Control (Multi-vendor)
- OpenLAB ECM Intelligent Reporter
- Regulated and non-regulated modes
- Web-based options

**OpenLAB ECM**
Enterprise Content Manager
Scientific Data Management System
- Data archiving
- Instrument vendor neutral
- Viewers, filters, converters
- Agilent workstation aware!
- Time stamp/audit trail
- Report capture
- E-signatures
- Regulatory compliance
- TNF conversion (LTDA)

**OpenLAB ELN**
Electronic Lab Notebook
Capture, Organize, Collaborate, Protect
- Smart, high productivity alternative to paper notebooks
- IP protection and compliance features
- Simplifies and accelerates lab work
- Smart data import and dynamic forms
- Simple web-based client
- Analytical request module

**OpenLAB**
Professional Services
Integration of OpenLAB Solutions
- Speeds full utilization of OpenLAB software & instruments
- Maximizes the return on investment in OpenLAB
- Accelerates OpenLAB adaptation to existing workflows
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Agilent OpenLAB ELN
Electronic Lab Notebook

A Web-based ELN which enables you to...

• Document, manage and share across multiple disciplines with a single solution
• Search and collate disparate data sources into single experiment
• Reduce cycle times with integrated workflow processing and improve lab efficiency
• Integrate with existing information systems

Resulting in...

• Improved efficiency and data quality
• More secure Intellectual Property protection
OpenLAB ELN

- Cell biology and Molecular biology
- Genomics and Proteomics
- Chemistry (synthetic and analytical)
- Toxicology and Forensics
- General R&D

- Rich text environment for free-form data entry
- Insert images, searchable annotations
- Re-use protocols and methods
- Clone previous experiments
- Link to external sources (e.g. websites, documents)
- Import files, data and results from other applications
Experiment results in OpenLAB ELN...

<table>
<thead>
<tr>
<th>Gene Name</th>
<th>Gene Symbol</th>
<th>Fold Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-box and wt-40 domain protein 7 (archipelago)</td>
<td>FBXW7</td>
<td>0.5</td>
</tr>
<tr>
<td>Enzyme e2, j1 (ubc6 homolog, yeast)</td>
<td>UBE2J1</td>
<td>0.6</td>
</tr>
<tr>
<td>Enzyme e2b (rad6 homolog)</td>
<td>UBE2B</td>
<td>0.7</td>
</tr>
<tr>
<td>CUL4A</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Enzyme e2i 3</td>
<td>UBE2L3</td>
<td>1.4</td>
</tr>
<tr>
<td>Protein 11</td>
<td>FBXW1</td>
<td>1.4</td>
</tr>
<tr>
<td>Ubiquitin protein ligase e3a (human papilloma virus-associated protein, angelman syndrome)</td>
<td>UBE3A</td>
<td>1.6</td>
</tr>
<tr>
<td>E3b suppressor of cytokine signaling 1</td>
<td>SOCS1</td>
<td>1.6</td>
</tr>
</tbody>
</table>

A fold change of 0.6 indicates the expression level after exercise is 60% of the expression level before the exercise. A fold change of 1.6 indicates the expression level after the exercise is 130% of the expression level before the exercise.

Key area to watch

Add free text, urls and links to external applications

Link to the original data files

Create tables or embed MS Excel spreadsheets

Insert and annotate images
Case Study: Quickly enter protocol details with Experiment Templates

- Prompt for required values
- Fast data entry with pick lists
- Quickly add one or more Forms to an experiment

Neutrophil isolation

Samples isolated from 30 ml EDTA-treated peripheral blood.

Prep® Density Gradient Medium (SIGM). The time from blood draw to stabilization of RNA never exceeded 90 min. Using Wright-Giemsa stain, we determined that this approach to isolation consistently yielded ≥ 95% purification.

RNA Extraction

Total RNA was extracted using TRIzol® (Gibco BRL Life Technologies, 141 Rockville, MD). RNA pellets were resuspended in diethyl pyrocarbonate-treated water. RNA integrity was assessed (prior to beginning target processing) by running out a small amount of each sample (typically 25-250 ng/well) onto a RNA Lab-On-A-Chip (Caliper 144 Technologies Con) that was evaluated on an Agilent Bioanalyzer 1450 2100 (Agilent Technologies).
OpenLAB ELN – Predefined Forms

Protocol as a searchable field

Warning displayed with some values

All parameters are pre-filled with default values

Value is calculated depending on selection
Using Dynamic Forms and Excel in OpenLAB ELN

Predefined protocol including Excel templates for reagent calculation

Double click and open MS Excel...

Full functionality of Excel to update values, add calculations, graphics and macros
Managing changes within MS Excel

Maintain each version of Excel, see the history, track the changes
• **Signature workflow offers:**
  - Graphical status
  - Notification of next signers

• **Configuration:**
  - Witness/validation rules
  - # level of validation
  - Delegation
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OpenLAB can store any electronic data
- Central data storage in a compliance environment
OpenLAB’s ECM component can automate the centralized storage of all electronic data within your laboratory – both raw analytical and report data.
Automated Data Collection with OpenLAB

OpenLAB’s ECM Scheduler component automates the transfer of any analytical data within your laboratory – regardless of the instrument vendor.
• The PDF files that are stored in the Air_Water, Tune, and Tune_Eval folders can be signed with the Adobe PDF signature tool.

• This tool encrypts a visible signature within the PDF file.

• The signature is present when the file is viewed, printed, or removed from the ECM.

• Signing the PDF files with the Adobe PDF Signature tool requires Adobe Acrobat (not Reader)

• PDF files that are stored inside the SSIZIP file can not be signed individually.
Interacting with Content from Desktop Applications

Integration with Desktop Applications like Microsoft Office, Adobe Acrobat

Open and Save files directly to the content repository from familiar desktop application

Small OpenLAB toolbar mimics Desktop functions with Content security

Search the content repository from within the Desktop application for files of interest

Compare documents or versions stored in the repository
Cell by Cell auditing capabilities for Excel spreadsheets

Audits cell content changes
Audits cell formula changes
Audits macro changes

Each audit trail entry captures:
- Date / time of edit
- User ID
- Worksheet name and cell
- Old / New value
- Description & Reason for change

View the entries for a single cell

Or the entire spreadsheet
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OpenLAB Control Panel

Central point for:

- Launching ChemStation & EZChrom instruments
- “Lab-at-a-Glance” view
- Administration of users, storage and instruments
- User privileges/user security
- Administrative reports

New look and feel:

- Intuitive
- Easy-to-use

Support and troubleshooting:

- Central access to all config and log files

Scalability for instrument management and administration
OpenLAB Control Panel

- Lab at a Glance
- Instrument status
- System logbook
- Any errors
**OpenLAB CDS**
Chromatography Data System

**Workstation**
ChemStation Edition – Agilent LC/GC/LCMS/CE/AD

Or

EZChrom Edition
Control of Agilent LC/GC Waters, Shimadzu, Varian, PE…
OpenLAB CDS

Server Room

OpenLAB CDS Server(s)
Web, App, File Transfer, IR, SS
SQL or Oracle DB
(DB will be on a separate Server)

Example topology 1:
OpenLAB CDS –
Example: Local ChemStation

CDS Clients

LC Lab 1

GC Lab 1

LC Lab 2

Mass Spec Lab 1

ChemStation Client

Note: 1200 LC data buffering in instrument
OpenLAB CDS

Server Room

OpenLAB CDS Server
Web, App, File Transfer, IR, SS
SQL or Oracle DB
(DB will be on a separate Server)

Example topology 2:
OpenLAB CDS - AIC
Remote Access / Control / Processing / Monitoring

CDS Clients

GC Lab 1

GC/MS
LC/MS
ICP-MS

AIC = Agilent Instrument Controller

Note: 1200 LC data buffering in instrument (flash)
OpenLAB Intelligence Reporter

- Reports from CDS Instruments*
- Dynamic report templates
- Database reporting
- Automatic report generation
- Simple to advanced calculations with control charts
- Easily export results to Excel, PDF, or other formats
- Reports and templates managed securely in ECM
- Report templates work across different analysis/sites

System Suitability Test

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
<th>RSD(RT)</th>
<th>RSD(Area)</th>
<th>Resolution EP</th>
<th>PW 60%</th>
<th>K'</th>
<th>S/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>des-hyd cis tramadol (C)</td>
<td>0.805</td>
<td>0.789</td>
<td>1.728</td>
<td>15.688</td>
<td>-0.040</td>
<td>21.307</td>
<td>11.306</td>
</tr>
<tr>
<td>des-hyd trans tramadol (B)</td>
<td>0.746</td>
<td>0.735</td>
<td>1.008</td>
<td>3.771</td>
<td>-0.127</td>
<td>22.403</td>
<td>9.547</td>
</tr>
<tr>
<td>o-desm tramadol (D)</td>
<td>0.823</td>
<td>2.130</td>
<td>2.789</td>
<td>0.291</td>
<td>6.800</td>
<td>9.001</td>
<td></td>
</tr>
</tbody>
</table>

Results GC Samples

<table>
<thead>
<tr>
<th>Sample</th>
<th>RT</th>
<th>Area</th>
<th>Amount</th>
<th>Sample</th>
<th>RT</th>
<th>Area</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS RSD 2</td>
<td>1.44</td>
<td>3.16</td>
<td>5.1944</td>
<td>SS RSD 2</td>
<td>1.44</td>
<td>3.16</td>
<td>5.2022</td>
</tr>
<tr>
<td>SS RSD 2</td>
<td>1.43</td>
<td>3.17</td>
<td>5.2245</td>
<td>SS RSD 2</td>
<td>1.43</td>
<td>3.17</td>
<td>5.2186</td>
</tr>
<tr>
<td>SS RSD 2</td>
<td>1.44</td>
<td>3.14</td>
<td>5.1784</td>
<td>SS RSD 2</td>
<td>1.44</td>
<td>3.14</td>
<td>5.1784</td>
</tr>
</tbody>
</table>

Average | 1.44 | 3.16 | 5.2142 | 1.82 | 1.29 | 5.4645 |
Stand Dev | 0.02 | 0.0323 | 0.01 | 0.0081 |
Min | 1.43 | 3.14 | 5.1784 | 1.82 | 1.27 | 5.3594 |
Max | 1.44 | 3.14 | 5.2182 | 1.83 | 1.31 | 5.5515 |

*Note: CDS Instruments are a leading provider of laboratory information management systems (LIMS) and laboratory automation solutions.
Summary: From the Lab Bench to the Desktop - OpenLAB

**Laboratory**
- Centrally store all data, reports, knowledge
- Security, versions, audit trail, e-sig
- OpenLAB unifies data, information and regulatory compliance

**Office/Home**
- Run & Reprocess from anywhere
- Easily find data and results
- Create custom reports
- Collaborate: ELN (Word, Excel, PDF)

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Steve Brown
Questions

Where to get more information

- Agilent Account Managers
  or
- Agilent Informatics Product Specialists
  Linda Johnson 302-636-3805  
  [linda_johnson@agilent.com](mailto:linda_johnson@agilent.com)

Steve Brown – West - Midwest
Marc Mandelbaum – East Coast
Jonathon McSayles – Midwest to North East
Steve Miller – Southern States
Spencer Tse – West Coast