Roundtable Session 1 – Table 4 – AI in CE Biopharma Workflows: Practical Applications and Future Opportunities

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Abstract:

AI has the potential to transform CE biopharma workflows by reducing manual data review, accelerating method development, improving troubleshooting, and enabling more consistent, data-driven decisions across analytical development and quality environments.

This roundtable will explore how AI can support the next generation of CE biopharma workflows by improving data review, method development, troubleshooting, documentation, and digital lab integration. The discussion will focus on practical near-term opportunities, the safeguards needed for regulated environments, and the future vision of connected, adaptive analytical workflows that enhance scientific expertise.

Discussion Questions:

- Where can AI deliver near-term value? Which CE workflow steps—data processing, review, troubleshooting, or reporting—offer the most immediate opportunity for AI-enabled efficiency?

- Improving consistency and scalability: How can AI help standardize interpretation across analysts, instruments, sites, and high-throughput workflows?

- Using historical data more effectively: What types of CE data, methods, deviations, and reports should be prioritized to support searchable knowledge and better decision-making?

- Managing risk in regulated environments: What level of validation, explainability, auditability, and human oversight is needed before AI tools can be trusted in analytical development or quality settings?

- Defining the future CE lab: What would a connected, adaptive CE workflow look like when integrated with automation, real-time monitoring, and cross-platform analytics

Notes:

What applications do you envision for AI?

AI can support data analysis, statistical evaluation, and figure generation.

What do you expect from AI, where can it be applied, and is data availability the primary bottleneck?

AI can rapidly analyze massive datasets. In a GMP environment, it could review years of data across systems, groups, campaigns, and molecules to identify emerging trends and relevant features.

AI can help design DoE studies to identify optimal conditions during troubleshooting.

It can also support strategies for evaluating different systems.

AI outputs should be validated by comparing results.

Effective use also requires clear boundaries, including explicitly defining what the model should not do. Claude follows directions only 35% of the time, while ChatGPT or Codex may be more consistent. Users should also distinguish a *deterministic model*, which follows precise instructions, from a *reasoning model*, which is better suited to interpretation or creativity.

Example—icIEF method development: Create a self-guided AI project rather than waiting for a team to assemble. The workflow could include: 1. providing initial experimental data; 2. analyzing the results; 3. identifying improvements; and 4. proposing follow-up experiments. Accurate inputs, sufficient context, and iterative questions are essential before moving to specific tasks such as DoE design and summarization.

Example of how to guide AI:

1. Ask AI to identify a relevant DoE paper.
2. Ask it to summarize the paper.
3. Narrow the scope through follow-up questions.

For peer-reviewed literature analysis, ChatGPT and Gemini may be less effective; Perplexity may be better suited to this purpose.

How should we address incorrect AI assumptions?

Context is critical because AI models generate responses from the information provided. If the output is incorrect, revise the prompt with clearer, more complete instructions.

For data analysis, ask AI to organize and assess the dataset in a table. An agent trained on uploaded data can identify potential issues and support quality control.

In a GMP environment, how can an AI-enabled data analysis project be validated to ensure trustworthy results?

Ask AI to cite each statement and flag potentially unsupported content. Carefully evaluate the underlying data, because poor-quality inputs can bias the analysis and undermine reliability.

How can we keep pace with the rapid development of AI and learn to use it effectively?

Follow AI educators such as Sabrina Romanov, Mariah Brunner, Rob the AI Guy, and Maverick GPT, who share practical guidance on Instagram.

Listen to podcasts while commuting and ask ChatGPT for guidance on building your AI knowledge and skills.

A dedicated project that retains previous chats can provide context and improve future interactions.

How do you envision AI being used in the laboratory?

AI can generate programming logic for liquid-handler methods quickly and efficiently. Users can build a complete workflow by teaching the system individual blocks and connecting them.

AI can also support protein sequencing by predicting fragments from a protein sequence and enzyme information.