

# **Regulated Bioanalysis**

## *(Method Development, Validation, Sample Analysis)*

### **I. MASS SPECTROMETRY 101**

1. Elements of chemical structure.
2. The mass spectrum.
3. Unit mass resolution.
4. The LC/MS system.

### **II. MASS SPECTROMETRY AS A DETECTOR FOR HPLC**

5. Basics of chromatography.
6. Mass spectrometer components.
7. Positive and negative ions.
8. SRM LC/MS (MRM) bioanalysis.

### **III. APCI INTRODUCTION: ATMOSPHERIC PRESSURE CHEMICAL IONIZATION**

9. Mechanism of APCI.
10. The heated pneumatic nebulizer LC/MS interface.
11. When to employ APCI LC/MS techniques.
12. Dual ESI/APCI Ion Sources.

### **IV. ELECTROSPRAY INTRODUCTION**

13. Ion generation from charged droplets.
14. Pneumatically assisted electrospray-ion spray.
15. Ion spray advantages and disadvantages.
16. Sprayer geometries.

### **V. SAMPLE PREPARATION FOR LC/MS**

17. Types of extractions.
18. 96-well format.
19. Automation.
20. Novel strategies.

## **VI. PRELUDE TO DEVELOPING AND VALIDATING BIOANALYTICAL METHODS**

21. Setting up and Operating an LC/MS laboratory.
22. Relative benefits of triple quads, ion traps and HRMS systems for quantification.
23. MS/MS behavior.
24. The six attributes of a good method validation.

## **VII. INTRODUCING BIOANALYTICAL METHOD VALIDATION (BMV)**

25. History of bioanalysis regulations.
26. Key elements of method validation.
27. Overview of method validation strategy.
28. Required documentation.

## **VIII. PRE-STUDY LC-MS METHOD VALIDATION**

29. Following on from method development.
30. BMV criteria and measuring method performance.
31. Emerging developments in method validation.

## **IX. IN-STUDY LC-MS METHOD VALIDATION**

32. Preparing for sample analysis.
33. Method performance in sample analysis.
34. When and how to conduct sample reanalysis.

## **X. TROUBLESHOOTING VALIDATED METHODS**

35. Key performance indicators.
36. When things go wrong – even with a validated method.
37. Investigation strategies and documentation.

## **XI. CHALLENGES AND OPPORTUNITIES FOR THE LC/MS BIOANALYTICAL SCIENTIST**

38. Tiered Approaches and Scientific Validation.
39. Endogenous analytes.
40. Biologic Molecules.
41. Tissue sample bioanalysis.

## **XII. HANDLING THE AUDITS AND REGULATORY INSPECTIONS**

- 42. Training the team.
- 43. Preparing for Inspection.
- 44. Managing the inspection.
- 45. Follow up actions.