

LC-MS/MS Basic &
Intermediate Course
Sept. 11,12,13 2002

BCIT

Attn: Forensic Science Department
3700, Willingdon Avenue
Burnaby, BC
V5G 3H2

REGISTRATION FORM

Name _____
Address _____
Phone _____
e-mail _____
Fax _____
Method of Payment: Cheques only _____
Signature _____

Sign up as: Price
CVG or/and CSMS Member \$600.00 (+ GST)
Non-Member \$700.00 (+ GST)
 paid by cheque
 billed on my company PO# _____
 I will not be able to attend. Please add my name to
your mailing list for the next course

Total: _____

LC-MS/MS Basic &
Intermediate Course
September 11,12,13 2002
at
British Columbia Institute of
Technology
3700, Willingdon Avenue,
Burnaby, BC

Registration: 7:30am-8:30am
Course: 8:30am-5:00pm

Registration fee includes continental breakfast,
lunch and refreshments

CVG or/and CSMS Member..\$600.00
Non-Member.....\$700.00

Registration Deadline: August 26th, 2002

Mail registration form and fee payable to:

BCIT
Attn: Forensic Science Department
3700, Willingdon Avenue
Burnaby, BC
V5G 3H2

For questions about registration, contact us at:
Phone: 604-451-7178 (Mr. Edwin Chan)
Fax: 604-431-4516
E-mail: echan@bcit.ca

For further course information contact us at:
Phone: 416-693.3451 (Dr. Fabio Garofolo)
Fax: 416-693.3478
E-mail: garofolo_fabio@lilly.com

Website: www.cvg.ca

Instructor: The course was developed by and will be presented by Dr. Fabio Garofolo. He has been involved in High Performance Liquid Chromatography (HPLC), Gas Chromatography - Mass Spectrometry (GC-MS) and mainly Liquid Chromatography - Tandem Mass Spectrometry (LC-MS/MS) for more than 10 years and has specialized in the application of this technique in forensic, analytical and bioanalytical applications.

Dr. Garofolo currently serves as Senior Scientist/Technical Manager/Team Leader at Lilly Laboratory for Bioanalytical Research, Eli Lilly Canada, where he offers information in the field of bioanalytical method development. Capitalizing on an extensive occupational background within his specialization field, he develops original methods for the identification and quantification of new and innovative drugs in human and animal plasma.

Career Steps: Senior Scientist/Technical Manager/Team Leader, Lilly Laboratory for Bioanalytical Research, Eli Lilly Canada (Present); Laboratory Director/Leader of the Method Development Group, Bioanalytical Laboratory, Biovail Contract Research Canada (1998-2000); Laboratory Director/Senior Research Chemist, R&D Dept.-Analytical Laboratory, Italian Air Force Italy (1994-1998).

Accomplishments: 20 Publications & Presentations in International Conferences; 63 Bioanalytical and 24 Analytical Methods Developed. Author and instructor of 14 LC-MS/MS courses.

Education: Doctor in Chemistry (Major: Analytical Chemistry, Minor: Weather Forecast, Pollutants Dispersion) Italian Air Force & University "The Wisdom"-Italy (1994); Advanced Management, York University - Canada (1999).

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LC-MS/MS Basic &
Intermediate Course

Dr. Fabio Garofolo



September 11,12,13 2002
8:30am - 5:00pm
British Columbia Institute of
Technology



LC-MS/MS Basic & Intermediate Course

Duration: 3-day course

Objective:

Basic: to familiarize with the basic theory of LC-MS/MS. **Intermediate:** to familiarize the audience with the API Ionization process, Ion transmission in LC-MS/MS and with basic theory of Ion Trap.

Purpose:

Basic:The main purpose of this course is to teach the fundamental principles of Liquid Chromatography Tandem Mass Spectrometry to better understand the practical use and potentials of this important analytical technique. **Intermediate:**The main purpose of this course is to teach the criteria to follow during the optimization of a LC-MS/MS methodology and the fundamental principles of Ion Trap

Who Should Attend :

This course will be of value to all regulatory, technical and QA/QC personnel who work in an LC-MS laboratory with a general understanding of mass spectrometry (MS) and tandem mass spectrometry (MS/MS). This course has been also designed for all the new LC-MS/MS users, HPLC experts interested in Mass Spectrometry, analytical chemists and university students with limited understanding of mass spectrometry but willing to learn more about it. The course will be useful also for all the LC-MS/MS operators, both working with small and large molecules, interested in understanding the criteria to follow in the optimization of a LC-MS/MS methodology

Looking forward into future:

This LC-MS/MS Basic & Intermediate Course is the 1st and 2nd of a fully integrated 4-Level LC-MS/MS Course:

- 1) LC-MS/MS Basic Course
- 2) LC-MS/MS Intermediate Course
- 3) LC-MS/MS Advanced I Course
- 4) LC-M/MS Advanced II Course

The 4 LC-MS/MS courses have been designed to provide the appropriate level of instruction for all grade of LC-MS/MS operators. One-on one interaction between the instructor and students and the short tests between the lessons reinforce the information learned.

Focus:

The “LC-MS/MS Basic Course” emphasizes the theory of Liquid Chromatography tandem Mass Spectrometry and has a little focus on specific instrument hands-on operations due to the large number of different instrument brands. Students desiring a course for a specific instrument operator should refer to the courses offered by the instrument manufacturer. Students desiring training on instrument optimization should plan to take the “LC-MS/MS Intermediate Course”. Students desiring focused instruction on LC-MS/MS bioanalytical method development should explore the possibility of taking the “LC-MS/MS Advanced I/II Courses”



LC-MS/MS Basic & Intermediate Course

PROGRAM

Sept.11th 2002

1.1 INTRODUCTION AND INLETS

(Introduction to Mass Spectrometry, Components of a Mass Spectrometer, Arpino Symbolism (HPLC Vs MS), LC-MS interfaces and flow-rates, Stopped flow LC-MS, Disk interface, ParticleBeam,ThermoSpray, Moving Belt, Ionization Techniques:MALDI, FAB ,EI, CI)

1.2 API SOURCES

(Ionization Techniques: API, ElectroSpray (ES), IonSpray (IS), TurboIonSpray (TIS), Heated Nebulizer(HN), APCI)

2.1 MASS ANALYZERS

(Magnetic Sector, Ion trap, TOF, FT-MS)

2.2 MASS ANALYZERS

(Quadrupole: Theory, Ion Stability, Mathieu Equation)

3. QUADRUPOLE OPERATION

(Quadrupole MS Operations, Full Scan, Selected Ion Monitoring (SIM), Quadrupole MS/MS Operations, Precursor Ion Scan, Multiple reaction Monitoring (SRM), Product Ion Scan, Ion Path,Lents and Mass Filters, Collision Cell, Ion Detection)

Sept.12th 2002

4. API IONIZATION PROCESS

Part 1 : APCI Optimization

(Discharge needle, Quartz tube, Gases, Probe Temperature, Solvents and When to use APCI)

Part 2 : ESI Optimization

(On and Off Axis spray, pH and ESI, Additives & Buffers, Solvent effect, TFA fix, Divert Valve VIC Rule)

Part 3 : ESI Theory

(Charging of liquid, Electrospray Current, Rayleigh Stability Limit, Practical considerations from ESI Theory, ESI for small molecules, ESI for Large Molecule (Protein), Ion Evaporation Vs Charge Residue, Dole/Fenn and Iribarne theory, ESI as Electrochemical Cell, the 5 Gold Practical rules in ESI, Working in high sensitivity conditions)

5. ION TRANSMISSION

(Inefficiency of the Ionization Process, How and where to improve Ion, transmission efficiency in Triple Quad and Ion Trap, Orifice transfer, Ion focusing, skimmer transfer, Vacuum system, Multipole Characteristics, Round quadrupole, Octapole, Square quadrupole, Collisional Focusing, CID efficiency, Source CID, Collision cell, Cross Talk, LINAC, Fragmenting Ions, Advantage of MS/MS over MS)

Sept.13th 2002

6. INTRODUCTION TO THE ION TRAP THEORY

(Mass Analyzer= Mass filter, Basic Ion Trap Components, 4 steps of Ion trap, Collection, Ejection,, Isolation, Excitation, Automatic Gain Control, Matheiu Stability Diagram, Ion Trap Vs Triple Quad)