Process Sciences at Abbott Bioresearch Center

Mike Doremus

Purification Development

Abbott
A Promise for Life

Bio

- Education
  - BA Chemistry, Franklin & Marshall College (’79)
  - MS Chemical Engineering, Colorado State U. (’83)
- Professional
  - Fermentation Development Scientist, Squibb (’84 – ’89)
  - Abbott Labs (’89 - current)
    - N. Chicago: Fermentation Development engineer (antibiotics, biopesticides, plant growth regulators)
    - N. Chicago: Biologics purification process support (r- and h-urokinase)
    - ABC (’02): Purification Process Development, Process Sciences (rh-Thrombin, MAbs, K5)

Process Sciences Department: Mission

- Develop well characterized, robust, economically viable production scale processes for biopharmaceuticals
  - Monoclonal antibodies, other therapeutic proteins
  - Mammalian (or microbial) expression systems
  - Scale-up processes to production
  - Meet clinical and production timelines
  - Abbott and outside (contract) products
- Develop state-of-the-art biologics process technology
- Establish analytical Quality Control (QC) protocols
- Characterize products and processes

Process Sciences Organization

- Cell Culture
  - Develop mammalian or microbial process
- Purification
  - Develop protein purification process
- Protein Analytics
  - Develop analytical methods (identity, purity and content)
  - Impurity identification
- Scale-up Lab
  - Verify cell culture and purification processes before transfer to production

Technology

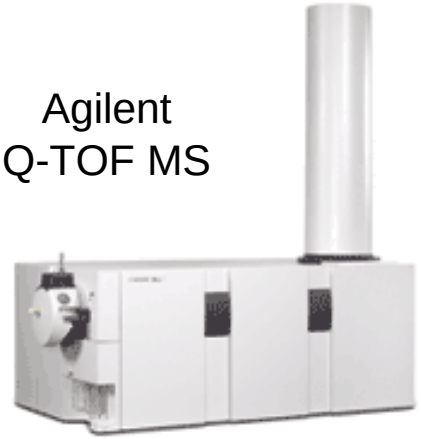
- Cell Culture
  - Mammalian & microbial fermentations
    - Flasks, spinners, wave bags,
    - Automated fermentors (2L to 300L)
  - Automated cell viability counters (Cedex)
  - Off-gas analysis
  - Metabolite analysis (glucose, lactate, etc.)
- Purification
  - Chromatography workstations (AktaExplorer)
  - Ultrafiltration / diafiltration systems
  - Filtration scale down models

Technology

- Analytical
  - HPLC
  - Mass Spectrometry
    - Ionization: Electrospray or MALDI
    - Separation: Time of Flight (TOF) or Ion Trap
  - Capillary electrophoresis (CE)
  - Circular dichroism
  - Analytical ultrafiltration (AUC)
  - Field flow fractionation (FFF)
  - UV/Visible/Fluorescence spectrophotometry

Agilent HPLC system

Agilent Q-TOF MS



Who works in Process Sciences?

- 35% PhD's
- 20% (Bio)Chemical Engineers
- 60% Male / 40% Female
- 29% Foreign born
- 27% Active athletes
- 2% Auto racer (1…)
- 100%
  - Dedicated
  - Interesting
  - Focused on their work

Educational Requirements

Section	(Micro) Biology	Bio-technology	(Bio) Chemistry	(Bio)Chemical Engineering
Cell Culture	X	X		X
Purification		X	X	X
Scale Up Lab	X	X		X
Protein Analytics			X	

Experience (the magic word)

- Internships
- Co-ops
- Part-time work
- Temporary work
  - (Manpower)

Questions?