Career Growth Areas in Pharmacology

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1-7-10
Academic Pharmacy’s Vital Statistics

Data from the American Association of Colleges of Pharmacy
Academic Pharmacy’s Vital Statistics

Institutions and Programs

• In fall 2010, there were 5,615 full-time and 575 part-time pharmacy faculty members at 117 colleges and schools of pharmacy.

• One hundred and twenty-three (123) colleges and schools will offer the Pharm.D. as a first professional degree in fall 2011.

• From 2007-2010, vacant faculty positions have been estimated to be approximately 400 per year.

• Sixty-seven (67) colleges and schools will offer graduate programs in the pharmaceutical sciences at the M.S. and/or Ph.D. level in fall 2011.

• Approximately 450 Ph.D. degrees are conferred annually by pharmacy graduate programs.

Data from the American Association of Colleges of Pharmacy
Academic Pharmacy’s Vital Statistics

Data from the American Association of Colleges of Pharmacy
Academic Pharmacy’s Vital Statistics

Faculty Growth in Pharmaceutical Sciences

Data from the American Association of Colleges of Pharmacy
Accreditation Council for Pharmaceutical Education
Guidance on Science Foundation for Professional Curriculum

• Basic Biomedical Sciences
  – Anatomy and Physiology
  – Pathology and Pathophysiology
  – Microbiology and Immunology
  – Biochemistry and Molecular Biology
  – Genetics and Biotechnology
Accreditation Council for Pharmaceutical Education
Guidance on Science Foundation for Professional Curriculum

• Pharmaceutical Sciences
  – Medicinal Chemistry
  – Pharmacology and Toxicology
  – Drug Formulation and Drug Delivery Systems
  – Drug Metabolism and Pharmacokinetics
  – Pharmacogenomics
Pharmaceutical Sciences Curriculum
Lipscomb University College of Pharmacy

Professional Pharmacy Program (4 Year Program)

• Year 1
  Semester 1
  – Anatomy and Physiology I (3 CH)
  – Biomolecular Chemistry (3 CH)
  – Microbiology/Immunology (3 CH)
  – Pharmaceutical and Medicinal Chemistry (3 CH)
  
  ❖ Integrated Biomedical Sciences Lab (2 CH)

  Semester 2
  – Anatomy and Physiology II (3 CH)
  – Biopharmaceutics (3 CH)
  – Pharmacology I (3 CH)
  
  ❖ Integrated Biomedical Sciences Lab (2 CH)

• Year 2
  Semester 3
  – Advanced Pharmacokinetics (3 CH)
  – Pharmacology II (3 CH)

  Semester 4
  – Pharmacology III (3 CH)
Integrated Biomedical and Pharmaceutical Sciences Laboratory
Core Curricular Concepts/Interdisciplinary Teaching

24 Lab Experiences:
• 14 Experiments
  – Protein Quantitation
  – PCR/DNA isolation
  – Gram +/- Organisms
  – Antibiotic Susceptibility Testing
  – Immunoassays
  – Ligand/Protein Binding
  – Enzyme Kinetics
  – CYP450 Inhibition Assays
  – Drug Dissolution
  – Drug Transport (PgP)
  – Topical/Transdermal Drug Delivery
• 8 Simulations
  – Physiology
  – Pharmacology
• 1 Modeling
  – Drug Design

Lab experiences are designed to emphasize core curricular concepts that impact drug discovery, formulation, delivery, disposition and response.
Integrated Biomedical and Pharmaceutical Sciences Laboratory
Core Curricular Concepts/Interdisciplinary Teaching

24 Lab Experiences:
- **14 Experiments**
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- **8 Simulations**
  - Physiology
  - Pharmacology

- **1 Modeling**
  - Drug Design

*Experiments are designed to facilitate team work and develop problem solving skills in experimental design, data analysis, and data interpretation.*
Integrated Biomedical and Pharmaceutical Sciences Laboratory
Core Curricular Concepts/Interdisciplinary Teaching

24 Lab Experiences:
• 14 Experiments
  – Protein Quantitation
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• 8 Simulations
  – Physiology
  – Pharmacology

• 1 Modeling
  – Drug Design

Help identify students for summer research programs and graduate programs.
Provide students with basic/advanced laboratory skills and teaching experience for future TAs.
Provide faculty with educational scholarship opportunities.
Pharmaceutical Sciences Faculty
Lipscomb University College of Pharmacy

• Faculty Background and Training – Phase I Hiring

- Akers, Pharm.D., Ph.D.  Clinical Pharmacology  University of Kentucky
- Deweese, Ph.D.  Biochemistry  Vanderbilt University
- Dilks, Ph.D.  Human Genetics  Vanderbilt University
- Fowler, Ph.D.  Analytical Chemistry  Ohio State University
- McCormack, Ph.D.  Immunology  University of Oklahoma
- Mercer, Ph.D.  Medicinal Chemistry  University of Maryland
- Phipps, Pharm.D., Ph.D.  Clinical Pharmacology  University of Kentucky
Drug Discovery and Development

Buchi
Thermal Rotary Evaporator

Teledyne
Flash Chromatography

Thermo
TSQ Quantum Access LC MS/MS

Synthesis and Separation

Purification

Quantitation
Drug Pharmacology Evaluation

Drug Targets and Signal Transduction

Figure 1
Drug Metabolism and Permeability

Enzyme Kinetics
CYP450 Inhibition Assay
Pgp Transporter Substrate Assay

Drug Permeability Assays
Drug Solubility Assays

Tissue Culture Capabilities
Cell based drug metabolism and transporter studies
Drug Product Evaluation

Drug Stability Testing

Drug Formulation Testing
Drug Disintegration
Drug Dissolution and Release

Drug Analysis
Drug Testing/Toxicology
Pharmacokinetics
Drug Taste and Smell
Evaluating Career Opportunities
New Pharmacy Programs

• Opportunities/Challenges
  – No Existing Silos to Breakdown/Critical Mass Issues
  – Teaching Effort/Research Effort
  – Educational Resources/Research Resources
  – Non-Tenure Track/Tenure Track

• Establishing Collaborative Partnerships
  – Research Projects
  – Training Opportunities
Pharmaceutical Sciences
Collaborative Training Opportunities

Professional Pharmacy Program (Pharm.D.)

“Graduate Certificate Program”
- Physiology
- Biomolecular Chemistry
- Pharmaceutical Chemistry
- Drug Delivery Systems
- Biopharmaceutics
- Pharmacokinetics
- Pharmacology
- Integrated Biomedical Sciences Lab
- Research and Training Facility
- Research Training Grant
- Independent Research Grants

“Degree Partnership Program”
- Terminology
- Drug Discovery
- Drug Formulation
- Drug Development
- Transfer/Cross Registration Courses
- Receptor Theory & Signal Transduction
- Scientific Communications
- Responsible Conduct in Research
- Electives

M.S. Degree in Pharmaceutical Sciences

Ph.D. in Pharmacology at Vanderbilt University

Undergraduate Program (B.S.)

SRP = Pharmaceutical Science Summer Research Program
Pharmaceutical Sciences Educational and Research Facility
Lipscomb University College of Pharmacy
Pharmaceutical Sciences Faculty
Lipscomb University College of Pharmacy

• Career Opportunities – Phase II Hiring
  – Faculty Hire #8  Pharmacology  ID/CNS/Oncology
  – Faculty Hire #9  Pharmaceutics  Formulation/Drug Delivery
  – Faculty Hire #10  Drug Metabolism  Pharmacokinetics

• Faculty Background and Training – Phase I Hiring
  – Assistant/Associate/Full Professor Level
  – Pharmacology/Drug Metabolism/Pharmaceutics
  – Research Skills and Ability to be an Effective Teacher (Experience)
  – Develop independent or collaborative research program
    • Team Science (Internal and External Partnerships)
  – Advance the mission of the department to establish innovative educational and collaborative research opportunities
    • Summer Research Program
    • Graduate Certificate/M.S. in Pharmaceutical Sciences
    • Degree Partnership Program
2010-11 Average Full-Time Pharmacy Faculty Salaries by Rank for Calendar-year Appointments

**All Institutions**

Professor: $145,982 (SD $39,116)
Associate Professor: $107,923 (SD $18,268)
Assistant Professor: $94,331 (SD $12,540)

**Public Institutions**

Professor: $147,607 (SD $40,795)
Associate Professor: $107,279 (SD $19,608)
Assistant Professor: $93,924 (SD $14,041)

**Private Institutions**

Professor: $139,669 (SD $31,070)
Associate Professor: $109,079 (SD $15,536)
Assistant Professor: $94,893 (SD $10,089)

Data from the American Association of Colleges of Pharmacy
Final Thoughts and Questions