Forensic Toxicology: Career Choices and Development
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Forensic Toxicology Answers the Question:

Did Alcohol or Drugs, Cause or Contribute to, this Person’s Death or Intoxication?
Practice Areas

• Human performance
  – Driving
  – Post Crash
  – Drug Facilitated Sexual Assault

• Death Investigation

• Regulated

• High throughput vs less casework/complex (interpretation)
Forensic Toxicology

Analytical

Interpretive
Analytical Toxicology

• Understanding the chemistry of the analyte.
• Knowing the capabilities of various analytical platforms (i.e. how instruments work).
• Understanding Quality Management requirements.
• Understanding data evaluation and assessment.
• Applying insight into working with problematic specimens.
• Understanding method development and optimization.
• Performing method validation.
Interpretive Toxicology

• Understanding the source of the sample and its limitations.
• Understanding how the result was obtained and its limitations.
• Thorough familiarity with the published literature on drug concentrations.
• Knowing the therapeutic, toxic and potentially fatal outcomes associated with different toxins.
• Relating laboratory findings to investigative, autopsy, and cognitive and behavioral findings.
Key Competencies

• Chemistry
  – Organic, Physical, Analytical

• Anatomy and Physiology

• Pharmacology
  – Pharmacodynamics, Pharmacokinetics, Metabolomics

• Psychology
  – Psychomotor Performance, Cognition and Behavior

• Communications
  – Written, Spoken, Critical reading

• Research
Is this the right career for you?

• Character Traits:
  – Love Science
  – Really Love Chemistry
  – Broad interest in multiple disciplines
  – Excited about communication
  – Strong stomach
  – Attention to detail
  – Open mindedness and fairness
Where do Forensic Toxicologists Work?

• Government Laboratories:
  – Public Health, Police/Public Safety, Attorney General, Prosecutor, Medical Examiner/Coroner, Military

• Academic Laboratories:
  – Laboratory medicine, Pathology, Toxicology

• Private Laboratories:
  – Forensic and clinical laboratories, military contractors
A Typical Days Work...

• Receive, inspect, process and accession specimens for testing.
• Review case histories or requests for testing.
• Assemble batches of samples from alcohol testing and drug screening.
• Review screening results, and order confirmatory testing.
A Typical Days Work...

• Perform instrument maintenance and set-up.
• Batch and extract samples for confirmatory testing.
• Analyze and review data from chromatographic testing.
• Batch and extract samples for quantitative testing.
• Review all data in the context of the case and generate a report.
A Typical Days Work...

- Develop or validate new methods.
- Review QC data.
- Research interpretive data to prepare a report.
- Discuss case and opinion testimony with attorneys and investigators.
- Testify in Court or at Deposition.
- Attend training.
- Obtain/maintain Certification(s)
Becoming a Toxicologist

• Three stages:
  – High school
  – Undergraduate degree
  – Graduate degree(s)

• Important to keep options open
Becoming a Toxicologist

• High School:
  – Chemistry, Biology, Physics
  – English
  – Math & Statistics
  – Experience in public speaking/presenting
  – Highest level of Chemistry, Biology, Math will facilitate undergraduate learning
Becoming a Toxicologist

• Undergraduate:
  – Course choices could include:
    • Organic Chemistry, Analytical Chemistry, Biochemistry, Toxicology, Biology, Pharmacology, Writing, Biostatistics, Research
  – Degree options include:
    • Chemistry, Biology, Forensic Science, Biochemistry
    • Must be in a Natural Science
    • Accelerated programs available
Becoming a Toxicologist

• Graduate:
  – MS and PhD programs available
  – MS need not be track selected but should include
    • Instrumental Analysis, preferably analysis of biological samples and Pharmacology
    • Forensic Chemistry or Forensic Science
    • Allows entry to labs at a higher level than with just degree
  – No bespoke PhD programs in US at present
    • Senior level entry positions
Forensic Science v Traditional Science Degrees

• Both are acceptable
• FS UG or MS degree includes additional benefits of courses in law, ethics, quality management
• Same core subjects (chemistry/biology) should be covered but with FS application
FEPAC

• Forensic Science Education Programs Accreditation Commission
• Maintains and enhances the quality of forensic science education through a formal evaluation and recognition of college-level academic programs.
• BS and MS programs are accredited
Your First Job

• Getting Hired
  – Understand the material, don’t just memorize it.
  – Be Active in Undergrad and Grad School.
  – Research and Internships.
  – Join, volunteer, read, tutor.
  – Have a broad knowledge of the State of Forensic Science.
  – Be flexible.
Your Ideal Job

• Service Work?
• Research?
• Management?
• Technical Supervision?
• Teaching?
Building Your Resume

• Consider Graduate School.
• Participate in Professional Organizations.
• Participate in Young Forensic Scientist Groups.
• Network, collaborate, visit other labs.
• Seek out training.
• Seek Certification.
• Find a mentor.
Professional Organizations

- Join AAFS, SOFT, SWAT, CAT, TIAFT, etc.
- Attend their meetings.
- Volunteer to help with meetings.
- Volunteer and participate in committees.
- Present at professional meetings:
  - Platform/Poster
- Write for newsletters.
Certification

• Requirements for Diplomate status: D-ABFT
  – Earned Doctorate
  – Adequate undergraduate and graduate education in biology, chemistry, and pharmacology or toxicology.
  – 3 years post doctoral experience in toxicology or closely related disciplines, including practice, research, teaching, administration.
Certification

• Requirements for Diplomate status:
  – Applicants are required to document a record of appropriate professional activities in forensic toxicology.
  – Applicants must be engaged in the practice of forensic toxicology at the time of application for Certification.
  – Comprehensive written examinations based upon broad principles of toxicology
  – Submit evidence of continuing professional education every year.
Certification

• Requirements for Specialist status: FTS-ABFT
  – Earned Bachelors degree
  – Adequate undergraduate and graduate education in biology, chemistry, and pharmacology or toxicology.
  – 3 years post graduation experience in toxicology or closely related disciplines, including practice, research, teaching, administration.
Certification

• Requirements for Specialist status:
  – Applicants are required to document a record of appropriate professional activities in forensic toxicology.
  – Applicants must be engaged in the practice of forensic toxicology at the time of application for Certification.
  – Comprehensive written examinations based upon broad principles of toxicology
  – Submit evidence of continuing professional education every year.
Salary Expectations

- Entering the field with a BS or MS degree in chemistry or related subject, non-certified:
  - $35,000 – 55,000
- Typical duties range from routine segmented work to case officer role.
- With experience, incremental grades add about $15% to salary.
- Certification may enhance salary.
- Public/Private are about equivalent.
Salary Expectations II

• Supervisory/Technical management role:
  – $65,000 – 85,000

• Laboratory Management role:
  – $80,000 - $120,000

• Academia:
  – Asst Professor $60,000 - $85,000
  – Associate professor $70,000 - $110,000
Resources

• www.AAFS.org
  – http://www.aafs.org/resources/employment-opportunities-short
  – http://www.aafs.org/students/student-career/choosing-career
  – http://yfsf.aafs.org/
Resources

• www.abft.org
• www.SOFT-TOX.org
• www.COFSE.org
2014 AAFS
66th Annual Scientific Meeting
Washington State Convention Center
Seattle, WA - February 17-22, 2014