

Teratology Primer, 3rd Edition

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What Does It Mean to Be a Teratologist Today?

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Teratology is a relatively young discipline and the field today was largely shaped by the thalidomide crisis of in the early 1960s (See the [Foreword](#) for historical perspective.) As you will see in subsequent chapters, the research and clinical practice of today's teratologists have advanced along with the advances in science. It is an exciting time to be in this field because we are not only making important progress in understanding the cause of birth defects, we are learning how to prevent them. This chapter provides insight into the various avenues where careers in teratology unfold.

Research

Understanding the adverse effects of exposures on human reproduction and development is complex and challenging, requiring partnerships among researchers from various disciplines. Genetics, maternal and paternal care, and socioeconomic factors are important for maternal, paternal, and embryonic health. Diet and chemical or drug exposures are also important, as is knowing when the mom, dad, or fetus is exposed. Untangling the relationships among these factors and an adverse human reproductive and/or developmental outcome often requires interdisciplinary collaboration.

Developmental biologists/geneticists, cell and molecular biologists, toxicologists, statisticians, epidemiologists, computational modelers, and clinicians have unique perspectives on how to approach studying the etiology of adverse developmental and reproductive outcomes. Developmental biologists/geneticists evaluate animal models throughout development and reproduction. These models may include fruit flies, worms, zebrafish, mice, rats, and other mammalian models. Cell and molecular biologists seek to understand processes and mechanisms inside of the cell and typically use in vitro cell models. Toxicologists take advantage of these two disciplines to focus on what happens to the model organism after an exposure (e.g., chemical, diet, radiation), the fate of the exposure (metabolism, activation/inactivation, accumulation) inside the organism, and the potential biological interactions that occur. Statisticians can help set up study designs and analyze the data gathered to determine the significance of an exposure associated with a reported effect. Epidemiologists investigate causes of adverse health effects by designing research studies and surveys to collect data and then studying the patterns within these data. Computational modelers use computers to simulate complex system behavior by first defining the system into easy to understand parts. Then, using math and statistics rules, complex interaction among the parts that are not seen intuitively can be revealed. Finally, clinicians help mitigate illness in humans (or in animals, for veterinarians) and can also have a research laboratory of their own. Typically researchers are hybrids of these disciplines (and others) and collaborate with each other to provide a unique perspective on how to design and interpret study data for developmental and reproductive disorders and birth defects.

Translation

Educating patients and the public, regulating what is known to be harmful, and advocating for developmental and reproductive research allows one to translate the latest research knowledge about birth defects and developmental and reproductive disorders into practice. Clinicians in obstetrics, medical genetics, neonatology, and pediatrics focus on taking care of and treating patients throughout pregnancy, after parturition, and during childhood. Counselors in these fields spend time with patients and families to provide personalized care information, foster understanding of test results, and provide the latest health recommendations. Risk and safety assessors evaluate the benefits of a product (e.g., pesticide or drug) with the risks for potential adverse pregnancy and reproductive outcomes. With this information, regulations may limit the use of certain products to adults not trying to conceive or to non-pregnant females and provide labeling on products to limit exposures during sensitive time periods. Finally, advocates for developmental and reproductive health have campaigns, websites, hold events, form societies, and publish research articles to make the public aware of the research and best practices, as well as raise funds to help further research efforts. Effectively translating and advocating research often requires knowledge about the field; therefore, many of the people involved hold similar backgrounds as those performing the research.

Where Do Teratologists Work?

In almost every job sector, you can find careers dedicated to researching and translating birth defects and disorders of developmental and reproductive origin. Research is accomplished by individuals at all career levels, from undergraduate students to scientific and regulatory directors. Private and public hospitals and medical clinics provide medical professionals the opportunity to translate the latest standard of prenatal and postnatal care to practice. Journals allow research to be peer-reviewed and published for public availability. For-profit and non-profit societies and associations, as well as private individuals, are advocates for raising awareness and funds regarding developmental and reproductive disorders and birth defects.

The Teratology Society thrives on the diversity of our members. This diversity gives us the opportunity to research and understand birth defects and disorders of developmental and reproductive origin and to serve as a source of information for clinicians, researchers, and the general public. Within the Teratology Society, interactions occur at all levels, among an international multidisciplinary group of individuals that includes researchers, clinicians, epidemiologists, and public health professionals from academia, government, and industry. The Teratology Society welcomes and highly values students, fellows, and other trainees interested in understanding birth defects and disorders of developmental and reproductive origin, as well as professionals active in the field. You are the future.

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