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## Teratogenicity in Different Stages of Pregnancy

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### Abstract:

Teratogenicity, the potential of substances or environmental factors to disrupt embryonic or fetal development, remains a critical concern in maternal and child health. Understanding the teratogenic effects of various agents is essential for informing clinical practice, public health policies, and regulatory decisions. This comprehensive review synthesizes current knowledge on teratogenicity across different study methodologies employed in pregnancy research.

Animal studies have long been pivotal in elucidating teratogenic mechanisms and assessing the effects of potential teratogens. These experiments, typically conducted in rodents, allow controlled exposure scenarios and provide insights into developmental processes. Epidemiological investigations, leveraging population data, offer crucial insights into real-world teratogenic risks. While observational in nature, they provide valuable evidence of associations between maternal exposures and adverse fetal outcomes.

In vitro studies complement animal and human research, offering mechanistic insights into teratogenic pathways. By utilizing cell cultures or tissues, these studies uncover cellular and molecular responses to teratogens, aiding in the identification of potential targets for intervention. Clinical trials involving pregnant women are ethically constrained but may inadvertently provide insights into teratogenicity through observational analyses.

Case reports and case series provide anecdotal evidence of teratogenic effects, highlighting rare but significant associations between maternal exposures and adverse fetal outcomes. While inherently limited in generalizability, they underscore the importance of vigilance in identifying potential teratogens.

This review underscores the necessity of a multifaceted approach to studying teratogenicity in pregnancy, integrating findings from animal models, epidemiological investigations, in vitro studies, clinical observations, and case reports.

**Keywords:** Teratogen, Teratogenicity, Fertilization, Principle of teratology, Stages of pregnancy.

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