

Manifestations of developmental toxicity

Developmental defects caused by the action of teratogens have a **threshold character**. Thus, each of the teratogens can cause some complex damage only if a sufficient (critical) amount of cells of the base of an organ or organ component is damaged. If the exposure of the embryo to the given teratogen does not damage such a number of cells, the development defect does not occur. As the dose of the teratogen increases, the resulting effect on development also worsens. Some studies point out that fetal death and abnormal development are just different responses to the same stimulus at a different dose. Currently, a teratogenic effect is considered to be an agent in such a dose that it has been proven that it caused abnormal development of an individual, but is non-toxic to an adult person (mother). A developing individual is therefore usually more sensitive to environmental influences than an adult, already fully developed individual. It is due to many reasons such as: high proliferative activity or inability to detoxify certain substances.

Manifestations of abnormal development include malformation, deformation and disruption, growth retardation, embryoletality and functional impairment of the individual.

Malformation

Malformations are significant structural and shape deviations from the norm. They arise as a result of the action of a teratogenic factor that can affect apoptosis or the growth rate of individual parts of organs. The subsequent repair processes of the organism also affect the resulting malformation. Malformations can occur on individual parts of the body **in isolation** or **as part of multiple disabilities**. Teratogens may not only cause the emergence of a new rare malformation, but may also increase the frequency of malformations that occur more often in newborns for other reasons as well.



Skull malformation

Deformation and disruption

Deformation and disruption are other types of anomalies caused by pathological embryonic development. Deformations are variations in **shape and structure** caused by mechanical influences, while disruptions are caused by **sudden interruptions in development**.

Growth retardation

Growth retardation is a very common disability that is often associated with another developmental defect. With this retardation, growth slows down or stops completely, and thus also death. Proven prenatal growth retardation is considered to be the finding of **a newborn weighing less than 2500 g**.

Embryolethality

Embryo-lethality is a specific group of developmental toxicity indications. Some studies report that the death of an early embryo before the 20th week occurs in up to 1 in 2 cases. The death of the fetus before the 20th week ends in spontaneous abortion. If an older embryo dies (about 9 out of 1,000 births), a stillbirth occurs.

Functional damage

These are changes in an individual's behavior, they are the result of the action of harmful substances during the development of a certain part of the nervous or neurotransmitter system.

Links

Related articles

- Teratogens
- Congenital developmental defects

References

- RNDr. Božena NOVOTNÁ, CSc. a Doc. RNDr. Jaroslav MAREŠ, CSc. Vývojová biologie pro mediky. 1. vydání. Praha: Karolinum, 2005. ISBN 80-246-1023-X.