

Neurotoxicity, Immunotoxicity and Drug Toxicity – A Review

Dasgupta M*

Eutech Scientific Services, USA

***Corresponding author:** Manjistha Dasgupta, Eutech Scientific Services, Highland Park, New Jersey, USA 07869, Tel: 8624859902; Email: manjisthad@yahoo.com

Opinion

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Neurotoxicity is defined as a form of toxicity in which a biological, chemical and physical agent produces an adverse effect on the structure or function of the central and peripheral nervous system. It occurs mainly by the exposure of a substance called neurotoxins. Neurotoxins are the toxins that are poisonous or destructive to the nervous system and also causing neurotoxicity. Some common examples of neurotoxins are lead, mercury, cadmium, manganese, nitric oxide etc. Depending on the neurotoxin's chemical structure, it will affect certain or particular parts of the cellular structure or nervous system. Some of the symptoms of the neurotoxicity are loss of circulation, vision loss, paralysis or weakness of limbs, headache, behavioral problems etc. In near future neurotoxicity may be a devastating disease for our community. Many people are unaware about the disease called neurotoxicity and also the effect of toxic elements in our environment that slowly affects their brain and also the nervous system. Many doctors are also unable to detect this disease because lack of knowledge about neurotoxicity. Observations in humans and animal studies have clearly demonstrated that a number of environmental and industrial chemicals can adversely affect the immune system [1].

Immunotoxicology is the study of immune dysfunction resulting from exposure of an organism to a xenobiotic. Xenobiotics are the substances that are foreign to the body or to an ecological system. Xenobiotic includes ultraviolet radiation, chemical pollutants, therapeutics and recreational drugs. Immunotoxicology is a relatively new field and people started to familiar with the term immunotoxicology in the year of 1970s. Immunotoxicity is defined as adverse effects on the functioning of the immune system that result from

exposure to chemical substances. Drugs and chemical produce adverse health effects by influencing the immune system in one of three ways like causing a hypersensitivity reaction, suppressing the immune system and causing autoimmune disease.

In connection with the Immunotoxicity, the term toxicity can be defined as a how poisonous or harmful a substance can be. The drug toxicity occurs when a person has accumulated too much drug in his bloodstream, leading to a adverse effect in his body. In the context of pharmacology, drug toxicity occurs when a person has accumulated too much of a drug in his bloodstream, leading to adverse effects on the body or it may occur when the dose given is too high or the liver or kidneys are unable to remove the drug from the bloodstream, allowing it to accumulate in the body. Human takes number of drugs for health reason but unfortunately some can produce positively dangerous effects. Central Nervous system, Central Venous System, Lungs, Kidney, blood forming organs are the most affected organs due to drug toxicity. All compounds are toxic at high doses and all are safe at very low doses [2]. However, with certain medications, drug toxicity can also occur as an adverse drug reaction (ADR). Acute toxicity is more easily diagnosed, as the symptoms will follow the one-time administration of a medication. Blood tests can also screen for levels of the medication in the person's bloodstream. Chronic toxicity is harder to diagnose.

The most common over the counter drug Acetaminophen can be lethal if taken in higher doses. All drugs have primary intended effects and the secondary intended effects. The later one known as side effects or adverse effects. Although side effects can be treatable but

adverse effects can be sometimes life threatening. Stopping the medication and then later on "rechallenging" it, is one method of testing whether the symptoms are caused by the medication. So, it can be said that immunotoxicity, neurotoxicity and drug toxicity are interrelated to each other.

References

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2. Guengerich FP (2011) Drug Metab Pharmacokinet 26(1): 3-14.