



Exploring the Role of Oxidative Stress in Zika Virus-Associated Neurological Pathology

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DESCRIPTION

Zika virus is an infectious disease that is primarily spread through the bite of an infected *Aedes* species mosquito. It can also be transferred on from mother to child during pregnancy or childbirth, and through sexual contact. The symptoms of Zika viruses are usually mild and include fever, rash, joint pain, headache, and conjunctivitis (red eyes). However, more severe complications can occur if a pregnant woman becomes infected with the virus. For example, infection during pregnancy has been linked to microcephaly (small head) and other severe brain abnormalities in babies.

Recent studies have revealed a possible link between Zika virus infection during pregnancy and the development of neurobehavioral disorders in children. These disorders can include Autism Spectrum Disorder (ASD), Attention-Deficit/Hyperactivity Disorder (ADHD), anxiety, depression, learning disabilities and intellectual development disorders. Additionally, some research suggests that oxidative stress may be involved in the development of such neurobehavioral issues.

Oxidative stress is an imbalance between the production of reactive oxygen species in the body and its ability to detoxify them or repair any damage they may have caused. When there is too much oxidative stress present in the body, it can result in cell damage leading to chronic diseases such as cancer or neurodegenerative diseases like Alzheimer's. Additionally, oxidative stress has been linked to abnormal development of babies in utero. Although further research needs to be conducted before any conclusions can be drawn about the association between Zika virus infection during pregnancy and neurobehavioral issues seen in children later on, exploring this connection could potentially lead to new treatments for conditions such as Autism Spectrum Disorder (ASD) or Attention-Deficit Hyperactivity Disorder (ADHD).

The Zika virus has been making headlines since its first appearance in Brazil in 2015. While it was initially thought to be a relatively harmless virus, studies are now associating it to severe

complications, including neurological disorders. Recent research suggests that oxidative stress, an imbalance between the production of free radicals and the body's ability to counteract their harmful effects through antioxidant defenses, may play a role in the development of these neurological disorders. Oxidative stress occurs when there is an imbalance between the production of free radicals and the body's ability to prevent their damaging effects with antioxidants. Free radicals are highly reactive molecules that can damage different cellular components such as lipids, proteins, and DNA.

The resulting oxidative damage has been linked to several diseases including cancer and Alzheimer's disease as well as chronic inflammation. In recent studies, researchers examined how oxidative stress impacts neurodevelopmental issues in infants infected by the Zika virus while in utero. It was found that increased levels of oxidative stress markers were correlated with infant abnormalities such as microcephaly (abnormally small head) and central nervous system structural defects associated with Zika infection. This indicates that oxidative stress could have a role in neurodevelopmental alterations caused by the virus. Further research needed to explore the association between oxidative stress and neurological complications associated with Zika infection but these initial findings suggest that targeting this pathway may be an effective way to reduce the risk of neurodevelopmental problems linked to Zika infection. By understanding this connection, scientists could develop treatments or preventive measures that reduce or prevent these disabilities.

Zika virus has been associated to various neurobehavioral problems, including microcephaly and other developmental delays. To address these issues, researchers are exploring the potential of oxidative stress as a contributing factor and a possible target for treatment. When there is an imbalance in the body's production of Reactive Oxygen Species (ROS) and the body's ability to prevent their harmful effects. It is believed that this phenomenon may contribute to some of the neurological problems associated with Zika virus infection, and thus could

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represent a viable target for treatment. Currently, researchers are investigating potential treatments that focus on reducing oxidative stress. Antioxidant therapy is one such strategy being explored. This type of therapy involves introducing healthy antioxidants into cells to help reduce ROS levels and thus protect

against their damaging effects. Another potential avenue of treatment is pharmacological intervention, which involves using certain drugs or compounds that can inhibit or reduce ROS production or enhance antioxidant activity in cells.