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The Impact of Climate Change on Neurobiology: Emerging Evidence and Health Implications

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INTRODUCTION

Climate change, primarily driven by human activities, is rapidly transforming the planet's ecosystems and impacting human health in various ways. While the direct effects of climate change on physical health are well documented, emerging research suggests that climate change may also have profound implications for neurobiology. Increasing temperatures, extreme weather events, air pollution, and altered ecosystems may significantly influence brain health, contributing to the onset or exacerbation of neurological disorders. Understanding the link between climate change and neurobiology is critical for developing effective public health strategies in the face of a rapidly changing environment. Several factors associated with climate change can affect brain function and contribute to the development or worsening of neurological conditions. Rising global temperatures have been associated with an increased frequency of heatwaves, which may affect brain health. Extreme heat exposure can lead to dehydration, electrolyte imbalances, and thermal stress, all of which impact cognitive function and brain health. In vulnerable populations, such as the elderly or those with pre-existing neurological conditions, prolonged heat exposure can accelerate cognitive decline and exacerbate conditions like dementia. High temperatures also disrupt sleep patterns, further affecting mental health and cognition. One of the most concerning consequences of climate change is the increase in air pollution, particularly particulate matter, ozone, and nitrogen dioxide.

DESCRIPTION

Exposure to these pollutants has been shown to cause neuro-inflammation, which plays a critical role in the development of neurodegenerative diseases such as Alzheimer's, Parkinson's, and multiple sclerosis. Fine particulate matter can cross the blood-brain barrier, inducing inflammation in the brain and contributing to the loss of neurons and cognitive dysfunction. Long-term exposure to polluted air is associated with an elevated risk of neurodevelopmental disorders in children, including Autism Spectrum Disorder (ASD) and Attention-Deficit Hyperactivity Disorder (ADHD). Climate change-induced events such as floods, wildfires, and hurricanes contribute to extreme psychological stress. Natural disasters and displacement often lead to anxiety, depression, and Post-traumatic Stress Disorder (PTSD). Chronic stress can affect brain structures such as the hippocampus and prefrontal cortex, regions involved in memory and emotional regulation. Prolonged psychological stress has been linked to changes in the brain's neurochemistry and the development of mood disorders and neurodegenerative diseases. Moreover, anxiety about climate change itself—referred to as eco-anxiety—can. The growing body of evidence linking climate change to neurobiology highlights the need for urgent attention to the mental and neurological health impacts of environmental changes. Protecting brain health in the face of climate change requires a multi-faceted approach policy changes that mitigate climate change can help reduce exposure to environmental stressors like air pollution and extreme heat. Improving air quality and promoting climate-resilient infrastructure can lessen the burden of neurodegenerative and mental health conditions. Additionally, public health strategies should focus on providing mental health support to populations affected by climate-related disasters and stress. Increased awareness of the neurological risks associated with climate change can drive early detection and prevention efforts. For example, monitoring environmental factors like air quality and temperature extremes can help identify individuals at higher risk of cognitive decline or mental health issues. Early intervention, including stress-reduction techniques and neuroprotective therapies, may help mitigate these risks [1-4].

CONCLUSION

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The impact of climate change on neurobiology is an emerging area of research with significant implications for public health. Environmental stressors such as extreme temperatures, air pollution, and psychological stress can disrupt neurobiological pathways, contributing to cognitive decline, neurodegenerative diseases, and mental health disorders. Addressing the neurological consequences of climate change requires coordinated efforts in research, public health, and policy. By mitigating climate change and focusing on prevention and early intervention, we can protect brain health and improve quality of life for future generations.

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CONFLICT OF INTEREST

The author declares there is no conflict of interest in publishing

REFERENCES

1. Michaiel AM, Bernard A (2022) Neurobiology and changing ecosystems: Toward understanding the impact of anthropogenic influences on neurons and circuits. Front Neural Circuits 16:995354.
2. O'Donnell S (2018) The neurobiology of climate change. Naturwissenschaften 105(1-2):11.
3. Akil H, Nestler EJ (2023) The neurobiology of stress: Vulnerability, resilience, and major depression. Proc Natl Acad Sci U S A 120(49):e2312662120.
4. Zammit C, Torzhenskaya N, Ozarkar PD (2021) Neurological disorders vis-à-vis climate change. Early Hum Dev 155:105217.