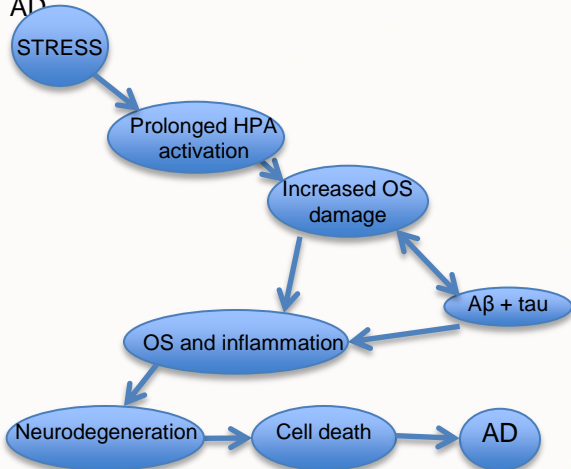


Oxidative Stress and AD

What is oxidative stress?

Oxidative stress (OS) occurs when an imbalance occurs between the production of free radicals and a cell's antioxidant capabilities. The **oxidative stress hypothesis** states that increased OS can trigger a brain-wide cascade of effects causing the degeneration of neurons typically seen in AD as well as other neurodegenerative diseases. GC release causes cells to become more prone to OS damage because they are less able to recover from the effects of free radicals. OS increases levels of A β peptide formation, inducing a positive feedback loop of OS and phosphorylating tau protein. Eventually, senile plaques are deposited in the extracellular space and neurofibrillary tangles form in the neuron itself. These further oxidative stress reactions and sustained inflammatory responses, leading to permanent cell damage. Eventually, enough cell death occurs cause cognitive decline, dementia, and finally, AD.



For more information about the latest research on yoga and mindfulness in the prevention of AD, please visit:

<http://www.alzheimersprevention.org/research.htm>



Namaste!

References

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Yoga and Alzheimer's Disease

How Practicing Poses Aimed at Stress Reduction Can Help Prevent the Onset of AD



Stress in Aging and AD

What is the stress response?

The brain responds to stressful situations by activating the **hypothalamic-pituitary-adrenal (HPA) axis**, leading to **glucocorticoid (GC)** release throughout the body and floods all our major systems, upregulating some processes and downregulating others to maximize our ability to manage the threat. Short-term responses cause increased blood sugar and blood flow to muscles, immune system suppression, and improved memory and learning. However, long-term activation of the HPA axis is a known risk factor for high blood pressure, depression, and cognitive impairments in learning and memory.

How does chronic stress affect the adult brain?

Prolonged elevation of GCs can damage the hippocampus, the area of the brain responsible for learning and memory, by causing its neurons to atrophy as well as inhibiting new neurons from forming. The **glucocorticoid cascade hypothesis** proposes that exposure to stress hormones reduces neurons' abilities to resist injury and attrition, causing them to be damaged or die at an increased rate. In animal studies, chronic stress accelerated behavioral impairments, increased deposits of **amyloid plaques**, and **A β precursor protein (APP)**, and increased **tau phosphorylation** within the hippocampus and cortex, a pathology commonly observed in AD. AD patients treated with GCs also showed an acceleration of their disease progression, further implicating stress as a risk factor in the development of Alzheimer's.

How can practicing yoga help?

Practicing yoga, an ancient Indian mental, spiritual, and physical discipline, benefits the whole body, including the brain. Various schools of yoga exist, each with a different points of focus. However, certain poses specifically target areas in the brain that are affected by AD. Below are a few simple poses that quickly and effectively help to oxygenate the brain, relieve stress, and cleanse tension from the body.

Poses

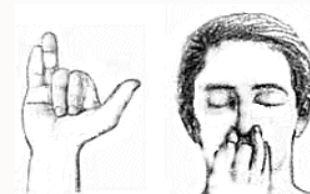
Half-Tortoise Pose

- Increases blood flow to brain
- Relieve tension in neck and shoulders



Alternate Nostril Breathing

- One nostril is alternately favored over the other
- Brings equal amounts of oxygen to both hemispheres of the brain
- Shown to quickly reduce perceived levels of stress



Standing Separate Leg Stretching

- Increases blood flow to brain
- Stretches spine



Kapalabhati Breathing

- Rapid diaphragmatic breathing
- Cleansing effect

