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A new perspective article highlights a compelling theory about migraine attacks: that they are an integrated mechanism by which the brain protects and repairs itself. Recent insightful findings and potential ways to use them to help migraine sufferers are published in *Headache*.

Migraines affect approximately 14% of the world's population, or 1.04 billion people. In the United States alone, migraine causes an estimated $36 billion annually in lost productivity, including 113 million lost work days.

Previous research has suggested that individuals who experience migraines have higher levels of oxidative stress. Jonathan Borkum, PhD, of the University of Maine, notes that migraine triggers—including stress, sleep disruption, noise, air pollution, and diet—can increase brain oxidative stress, an imbalance between the production of free radicals and the ability of the body to counteract their harmful effects. "Oxidative stress is a useful signal of impending harm because a number of unfavorable conditions in the brain can give rise to it," said Dr. Borkum. Therefore, targeting oxidative stress might help prevent or preempt migraines.

In his Views and Perspectives article, Dr. Borkum looks closely at the components of a migraine attack individually. In the context of a known threat to the brain—an interruption in blood supply—each of the components is protective: strengthening antioxidant defenses, lowering the production of oxidants, lowering energy requirements and, especially, releasing growth factors into the brain that protect existing neurons and support the birth and development of new neurons. "There are feedback loops between these components of a migraine attack that tie them together into an integrated system," Dr. Borkum explained. "Thus, it seems likely that migraine attacks are not simply triggered by oxidative stress, they actively protect and repair the brain from it."

For years, the temptation has been to see the migraine attack—the pain, nausea, and sensitivity to light and sound—as the disorder. Usually, though, the symptoms of a disease—for example, fever, swelling, pain, or cough—are not the disease itself but rather part of the body's defense against it. "So, the theory here tells us that to truly solve migraines we must look beneath the attack to understand the brain's underlying vulnerability, that is, what gives rise to the oxidative stress," said Dr. Borkum.

The theory suggests new directions for finding preventive medications and lifestyles, ones that focus on reducing oxidative stress and increasing the release of growth factors. It also sheds light on neural housekeeping, or how the brain maintains and heals itself. "The existence of an integrated system for protecting and repairing the brain could turn out to be quite useful—for example, we might one day be able to learn from this mechanism how to prevent neurodegenerative diseases," said Dr. Borkum.