What KYNA Neuroprotection Do You Need?

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Imagine your life the day you turn 70. Many of us see old age creeping in as we think of the people we know today at this age. Unfortunately one largely associated factor of old age is neurodegeneration, where neurons in various parts of the brain begin to die. Cell death can lead to a variety of malfunctions and therefore leads to a parallel variety of diseases. Many of us know at least one person with a neurodegenerative disease, such as Alzheimer's Disease, Huntington's Disease or Parkinson's Disease (just to name a few). These diseases, in addition to being detrimental to the elderly population, also often times have no cure. With no cure, neurodegeneration has become a hot topic in the neuroscience community.

Drugs and experimental treatments are tested every day on mice, rats, yeasts, primates, and humans (and many more organisms). When developing a drug, the easiest and least painful way of administration is a key factor. This therefore requires researchers to explore multiple options through which the medication could be effective. This process requires a creative outlook and the ability to step outside the usual realm of these diseases at hand and consider other angles of attack. This is exactly what happened with Alzheimer's and Huntington's Disease when Daniel Zwilling et al. chose the kynurenine pathway as a new form of attack in their article, Kynurenine3-Monooxygenase[KMO] Inhibition in Blood Ameliorates Neurodegeneration. Your kynurenine pathway (seen in the figure provided) is the route in which an important amino acid, tryptophan, is broken down. Researchers have previously observed that when the breakdown occurs, there are two main paths that the molecules can take. In the first direction, the tryptophan can be broken down into many toxic forms. We are particularly interested in a toxic form (KMO), which is then later responsible for cell death due to extracellular glutamate in the synapses and overstimulation. The second path, however, where the tryptophan is sent a different way and ultimately turned into KYNA, serves as a neuroprotector. With neuroprotectors in our system, the probability of cell death due to neurotoxicity decreases dramatically.

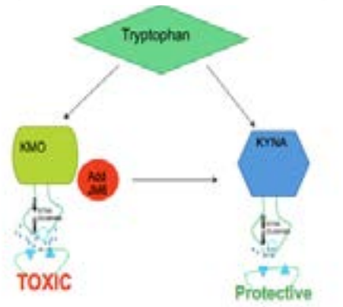
What Zwilling and his team focused on in their research was a pro-drug called JM6 that encourages the favorable neuroprotective
pathway through the inhibition of KMO. Using mice as a model of both Huntington's and Alzheimer's Disease, their team focused mainly on the variance in life span between mice with the disease and mice with the JM6 treatment as well as synaptic loss and extracellular glutamate. What they found was remarkable.

Zwilling and his team discovered that by introducing this drug into the kynurenine pathway, it significantly increased the amount of KYNA in the brain, inhibiting the toxic effects of KMO and reducing the excess glutamate. The inhibition of the neurotoxic element in harmony with chronic JM6 treatment caused the lifespan of the Huntington diseased mouse to increase dramatically (by at least 5 weeks). Additionally, in the Alzheimer's model of the disease, the spatial memory of the animals improved significantly and in both models, the synaptic loss was completely regained.

These exciting findings are extremely significant today in a field that has very few cures for the vicious

neurodegeneration occurring in a growing number of people. The drug JM6 and its creators are currently in the process of attaining a sample population for human trials and in the next few years will begin to fine-tune and develop this new hope for victims of both Alzheimer's and Huntington's Disease.

Zwilling showed great progress in the investigation of the kynurenine pathway and the relation to many more elements of the human body besides the importance to amino acids. Finding new and intriguing ways to treat the diseases that people fall victim to every day requires tremendous creativity. Furthermore, the universal use of a drug like JM6 could really kill two birds with one stone. Because the drug can be used in therapy for both Huntington and Alzheimer control groups, testing the drug further on many different diseases involving neurotoxicity and extracellular glutamate would be a great future s



The promise of the kynurenine pathway continues with other topics as well. Currently in many labs, the neurotoxic pathway of tryptophan is being studied and the various forms of neurotoxicity are being isolated and analyzed. The discovery of the pathway and the extreme interest in the cure for neurodegenerative diseases will, without doubt, result in amazing treatments to preserve the minds of those that fall victim to these unfortunate diseases.

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