Kynurenine is an amino acid that plays a significant role in the metabolism of tryptophan, another amino acid. It is a key intermediate in the kynurenine pathway, which is a metabolic pathway responsible for the breakdown of tryptophan.

When tryptophan is metabolized, it can follow two different pathways: the serotonin pathway or the kynurenine pathway. In the kynurenine pathway, tryptophan is converted into kynurenine by the enzyme tryptophan 2,3-dioxygenase (TDO) or indoleamine 2,3-dioxygenase (IDO). Kynurenine is further metabolized into several other compounds, including kynurenic acid, anthranilic acid, and quinolinic acid.

Kynurenine pathway metabolism is not only involved in the breakdown of tryptophan but also has important implications in various physiological processes and diseases. For example, kynurenic acid acts as a neuroprotective agent and antagonist of the N-methyl-D-aspartate (NMDA) receptor, which is involved in excitatory neurotransmission in the brain. On the other hand, quinolinic acid is an excitotoxin and a potent agonist of the NMDA receptor, and its accumulation has been linked to neurodegenerative diseases such as Alzheimer's and Huntington's disease.

Additionally, the kynurenine pathway has been associated with immune regulation. The metabolites produced during the pathway can modulate the immune response and have been implicated in various inflammatory and autoimmune conditions.

Overall, kynurenine and its metabolites have diverse roles in physiological processes and diseases, and research on the kynurenine pathway continues to uncover its significance in various fields, including neuroscience, immunology, and metabolism.

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