



# IPAM - Unveiling a Novel Anti-Aging Marvel from Tryptophan Derivatives

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## History

IPAM is a structural analog of the amino acid tryptophan, an important precursor for neurotransmitters serotonin and melatonin. It was reported in 2009 by a consortium of researchers of the University South Carolina, Texas, Ohio and Luebeck (Germany) as putative anti-aging agent.

The authors of this initial study hypothesized that mitochondrial function is an important factor the aging process of animals. Aging goes along with a decrease in the electron transport capacity in mitochondria and the release of reactive oxygen species, which are attributed to play a role in cell aging, is largely generated by mitochondria.

## Experimental Data

IPAM was found to be a potent

anti-oxidative agent capable of scavenging a wide range of naturally occurring radicals in cells and -more particularly- mitochondria. IPAM was envisioned as substance with better bioavailability compared to a similar compound which was characterized in previous research called indole-3-propionic acid (IPA). IPAM was much easier bioavailable compared to melatonin and IPA when administered intraperitoneally. It was also shown that IPAM did indeed have the ability to remove dangerous radicals without forming any reactive intermediates and that is was able to increase the electron transport capacity in mitochondria. Therefore, IPAM was able to reduce radical induced DNA damage. IPAM was also found to be a naturally occurring substance in the brain as a metabolite of tryptophan,

however at low levels (< 100 pg/mg protein), oral ingestion of tryptophan does however increase natural IPAM levels.<sup>1</sup>

In the same study, IPAM was administered to microorganisms called rotifers (sometimes referred to as wheel animals). At concentrations of 30  $\mu$ M in the growth medium, the animals experienced an extended lifespan from only to 24 days for untreated specimen to 90 days, while lower concentrations of 10 and 20  $\mu$ M IPAM led to a dose depended increase in lifespan (58 and 81 days respectively). IPAM did also unexpectedly increase the size of the rotifers by almost 50%.

## Conclusion

The initial data on IPAM is very promising, showing a powerful anti-aging effect of the compound. It could be one of the most effective compounds to

increase longevity, especially due to the relatively simple structure of IPAM. There are however no follow up studies, neither on microorganisms nor larger animals. There is also no good indicator at what level IPAM should be used in humans, so the effective dose remains elusive. The structural similarity of the compound to serotonin does give reason to believe there could be side effects on the brain due to the stimulation of 5-HT receptors at larger doses.

## References

- [1] B. Poeggeler, K. Sambamurti, S. L. Siedlak, G. Perry, M. A. Smith, M. A. Pappolla, *PloS one* **2010**, 5, e10206.

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