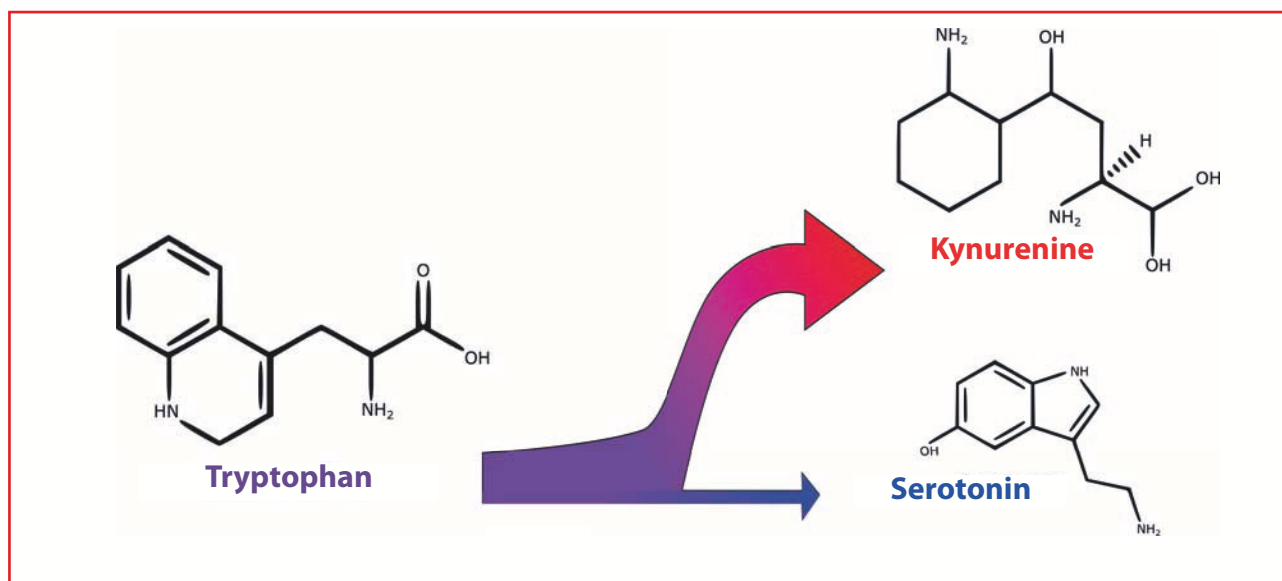


Tryptophan

A building block of serotonin and melatonin synthesis in the brain



IDK[®] Tryptophan ELISA

Competitive ELISA for the quantitative determination of L-Tryptophan in Dry Blood Spots

- ▶ Tryptophan intake influences the serotonin level in the brain
- ▶ Sufficient tryptophan level improves mood and sleep
- ▶ Reliable determination using simplified preanalytics: transport without cooling of samples via postal service due to **DrySpot-ID[®] Technology**



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**Determination of
Tryptophan:
Serum, plasma and dried
blood samples (K 7730)
Stool (K 7729)**

Treatment for serotonin and melatonin deficiency - Tryptophan improves mood

At the blood-brain barrier, tryptophan and competitive amino acids (CAA) compete for the L1 transporter. A decrease in tryptophan levels leads to the different symptoms of **serotonin/melatonin deficiency**.

Numerous studies have shown that a decreased level of tryptophan in relation to the competitive amino acids (CAA)¹ reduces the performance, for example, the reaction rate is decreased, therefore there is an increasing reaction time (Fig. 2)², and the tendency toward depression is increased^{3,4}, as the response to therapeutic interventions for patients with depression is decreased⁵.

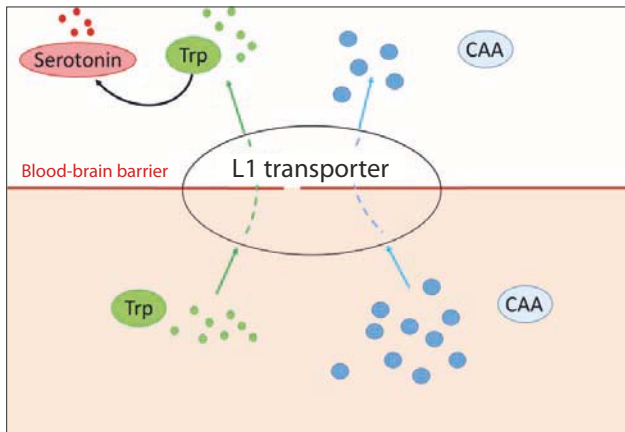


Fig. 1: Tryptophan and CAA (phenylalanine, tyrosine, leucine, isoleucine, and valine) compete for the L1 transporter to cross the blood-brain barrier. If the ratio is sufficient then enough tryptophan is absorbed into the brain and serotonin is produced.

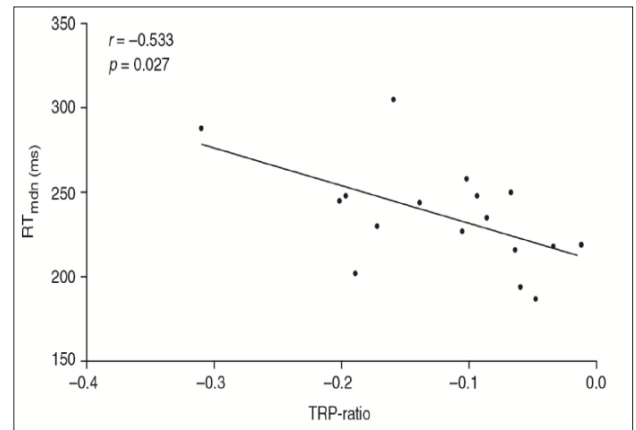


Fig. 2: Decline in tryptophan/CAA ratio decreases reaction rate and increases reaction time.

At the same time it was shown that targeted administration of tryptophan increases the level of serotonin in the CNS^{6,7} and symptoms of depression are reduced⁸. In addition to the tryptophan-serotonin-melatonin metabolism, tryptophan also influences sleep and, consequently, the quality of regeneration. In 2016, a large study including 29,687 subjects showed that increased absorption of tryptophan improved sleep and mood⁹.

Result: targeted and controlled intake of tryptophan can increase the tryptophan level and has positive effects on mood and depression!

Reduced levels of tryptophan can be determined simply and fast using the IDK® Tryptophan ELISA (K 7730) for a diagnosis of tryptophan deficiency.

IDK® Tryptophan	
Matrix	dried blood samples, serum, plasma
Sample volume	50 µL (dried blood spots) 25 µL (serum, plasma)
Test principle	ELISA
Cat. No.	K 7730

also available:

IDK® Tryptophan ELISA (stool) (K 7729)

IDK® Tryptophan high sensitive ELISA (KR3730) (for research use only)

IDK® Serotonin ELISA (serum, dried blood) (K 6880)

CE US: all products: Research Use Only. Not for use in diagnostic procedures.

Literature:

- ¹ Explanation: competitive amino acids (CAA) are phenylalanine, tyrosine, leucine, isoleucine and valine.
- ² Hildebrand, P. et al. (2015). Effects of dietary tryptophan and phenylalanine-tyrosine depletion on phasic alertness in healthy adults - A pilot study. *Food & Nutrition Research*, 59, 26407. <http://doi.org/10.3402/fnr.v59.26407>.
- ³ Toker L. et al. (2010) The biology of tryptophan depletion and mood disorders. *Isr J Psychiatry Relat Sci* 47: 46–55.
- ⁴ Moore P, (2000) Clinical and physiological consequences of rapid tryptophan depletion. *Neuropsychopharmacology* 23: 601–622.
- ⁵ Ormstad H, et al. (2016) Increased plasma levels of competing amino acids, rather than lowered plasma tryptophan levels, are associated with a non-response to treatment in major depression. *Eur Neuropsychopharmacol*. May 26. pii: S0924-977X(16)30046-3.
- ⁶ Musumeci G. et al. (2015) Changes in serotonin (5-HT) and brain-derived neurotrophic factor (BDNF) expression in frontal cortex and hippocampus of aged rat treated with high tryptophan diet. *Brain Res Bull*. 2015 Oct;119(Pt A):12–8. doi: 10.1016/j.brainresbull.2015.09.010. Epub 2015 Oct 9.
- ⁷ Ikram H. (2014) Dose-dependent effects of tryptophan on learning and memory. *Pak J Pharm Sci*. 2014 Sep;27(5):1131–5.
- ⁸ Bravo R. (2013) Tryptophan-enriched cereal intake improves nocturnal sleep, melatonin, serotonin, and total antioxidant capacity levels and mood in elderly humans. *Age (Dordr)*. 2013 Aug;35(4):1277–85
- ⁹ Lieberman HR et al. (2016) Tryptophan Intake in the US Adult Population Is Not Related to Liver or Kidney Function but Is Associated with Depression and Sleep Outcomes. *J Nutr*. 2016 Dec;146(12):2609S–2615S. Epub 2016 Nov 9. Review