

### Mixed Nuts as Healthy Snack: Effect on Gut Microbiota and Tryptophan Metabolism

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**Objectives:** We recently demonstrated that the consumption of mixed tree nuts (MTNs) as part of a hypocaloric diet decreased heart rate and increased satiety. MTNs can be categorized as a high tryptophan (Trp) food and disturbed Trp metabolism has been associated with cardiovascular disease. The fiber and polyphenol content of MTNs have been suggested to affect human health in part through the gut microbiome. Here, we aim to investigate the effect of MTNs on Trp metabolism and the gut microbiome and the link to cardiovascular markers and satiety.

**Methods:** Stool and plasma samples at baseline, week 12 and 24 from our recent randomized, controlled, two-arm study were studied. In the study 95 overweight individuals consuming 1.5 oz. of MTNs ( $n = 56$ ) or pretzel snack ( $n = 38$ ) daily as part of a hypocaloric ( $-500$  kcal) weight

loss diet for 12 weeks followed by an isocaloric weight maintenance program for additional 12 weeks. Trp metabolites kynurenine (KYN), kynurenic acid (KYNA), Trp, indole sulfate (IS), indole propionate (IPA) and indole acetate (IAA) were analyzed by LC-MS and HPLC. Gut microbiota will be analyzed by 16S rRNA sequencing.

**Results:** At baseline, a positive correlation was observed between heart rate and serum KYN levels and KYN/Trp ratio, as well as between BMI and KYN/Trp ratio. Compared to baseline, KYN levels were significantly reduced in the MTN group at the end of 12 week weight loss phase ( $P = 0.04$ ) and returned to baseline concentration after 12 weeks of isocaloric weight maintenance program (baseline vs. week 12 vs. week 24:  $357 \pm 124$  vs.  $339 \pm 103$  vs.  $362 \pm 137$  ng/mL), but not in pretzel group ( $418 \pm 431$  vs.  $347 \pm 150$  vs.  $375 \pm 171$  ng/mL). Other Trp metabolites evaluated were not changed during intervention in either groups. The gut microbiome analysis is ongoing.

**Conclusions:** We identified a positive association between Try-KYN metabolism and heart rate and BMI in overweight individuals. MTN consumption may directly affect Trp-KYN metabolism.

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