

# KETOGENIC DIET DECREASES SEVERITY OF EXPERIMENTAL AUTOIMMUNE ENCEPHALOMYELITIS

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## Objectives

Ketone bodies produced in the gut from dietary fiber by gut bacteria have potent anti-inflammatory properties. Ketogenic diet leads to production of ketone bodies, especially  $\beta$ -hydroxybutyrate, which interfere with inflammatory processes in a similar way. Here, we studied the effect of the ketogenic diet in mouse model of multiple sclerosis, experimental autoimmune encephalomyelitis (EAE).

## Methods

C57BL/6 mice were fed with ketogenic or standard diet starting 14 days before EAE induction with myelin oligodendrocyte glycoprotein peptide (MOG<sub>35-55</sub>) mixed with complete Freund's adjuvant, together with intraperitoneal injection of *Bordetella pertussis* toxin. The disease development was monitored for three weeks, and the state of T cell activation was analyzed in mesenteric or lumbar lymph nodes by flow cytometry.

## Results

Ketogenic diet delays EAE onset and significantly decreases its severity. Nevertheless, this mitigation is not accompanied with significant increase in regulatory T cells or decrease in major pro-inflammatory cytokines employed in EAE (IFN- $\gamma$ , IL-17A or TNF- $\alpha$ ) produced by T cells. Polarization of CD4<sup>+</sup> cells into Th1 and Th17 phenotypes, and populations of CD4<sup>+</sup> and CD8<sup>+</sup> T cells within mesenteric and lumbar lymph nodes also remain unaffected by the diet.

## Conclusion

We conclude that ketogenic diet decreases severity of EAE by yet unrecognized immunomodulatory mechanism. Supported by Lumina Quaeruntur (Czech Academy of Sciences, project number LQ200202105) and by programme "Foods for the Future" (Strategy of Czech Academy of Sciences AV21).

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