

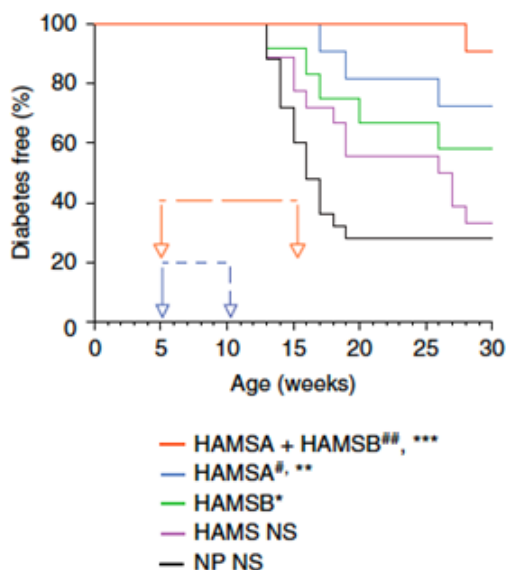
Dietary metabolites for autoimmune diseases

MEDICINAL SUPPLEMENT/DIETARY INTERVENTION

Product Type	Medicinal supplement/dietary intervention
Indication / ROA	Autoimmune diseases - type I diabetes (T1D), NASH, other
Target / MoA	Immune regulation through boosting Treg and re-building tolerance
Development Stage	Clinical trial in T1D in process
Brief Description & Differentiation	<p>Harnessing one of the body's natural tolerance mechanisms (the gut microbiome, short chain fatty acid, SCFA) to restore tolerance to autoantigens using SCFA-enhanced medicinal diet (everyday). Our HAMSA/B combination diet yields high colonic levels of SCFA metabolites (principally acetate and butyrate) as a potential preventative or treatment approach for T1D and other autoimmune diseases.</p> <ul style="list-style-type: none"> • Potential as medical supplement or dietary intervention • Potential to be an autoimmune therapy • Increases Treg number and function, decreases auto-reactive T cells, decreases pro-inflammatory cytokines • Improves gut homeostasis/integrity
Research Team	Prof Charles MacKay and A/Prof Eliana Moreno Marina (Monash BioMedicine Discovery Institute)
Intellectual Property	An international patent application (PCT/AU2017/050845) has been filed on the method of combination and delivery of metabolite compounds for the treatment and prevention of autoimmune diseases.
Key Publications	Marino, E. <i>et al.</i> Gut microbial metabolites limit the frequency of autoimmune T cells and protect against type 1 diabetes. <i>Nat. Immunol.</i> 18, 552–562 (2017).
Future	Commercial manufacture, regulatory strategy, combine with immunology treatments

➤ Key Data

Proof of concept efficacy data for dietary combination in T1D, NASH and other indications has been demonstrated *in vivo*.



SCFAs delivered high-amylose maize starch (HAMS) diet protect against T1D.

Incidence of T1D in female NOD mice fed the non-purified (NP) diet (n = 25 mice), HAMS diet (n = 17 mice), High-amylose maize starch acetylated (HAMSA) diet (n = 11 mice), High-amylose maize starch butyrylated (HAMS^B) diet (n = 12 mice) or combined (HAMSA plus HAMS^B) diet (n = 11 mice) for 10 weeks (HAMSA plus HAMS^B; orange arrows) or 5 weeks (all other diets; blue arrows), starting at 5 weeks of age. NS (NP vs HAMS, HAMS^B vs HAMS, HAMS^A vs HAMS, and HAMS^A vs NP); *P = 0.0482 (HAMS^B vs NP), [#]P = 0.0490 (HAMSA vs HAMS), **P = 0.0069 (HAMSA vs NP), ^{##}P = 0.0025 (HAMSA+HAMS^B vs HAMS) and ***P = 0.0008 (HAMSA+HAMS^B vs NP) (Mantel-Cox log-rank test).