L-serine prevents diabetes
- L-serine lowers diabetes incidence and improves glucose homeostasis

**Value proposition/USP**
Diabetes is a major health problem approaching epidemic proportions worldwide. It is associated with serious consequences for the patients regarding complications like blindness and cardiovascular disease, as well as the society in the form of increasing costs to treatment and care. Highly interestingly, we have recently demonstrated that treatment with the non-essential amino acid L-serine improves the signs of diabetes in mice. Thus, L-serine supplementation could be used to prevent diabetes in the population for the benefit of the patients and the society, and a human trial should be conducted to test the diabetes alleviating effect.

**Business Opportunity/Objective/Commercial Perspectives**
Treatment with L-serine is a new possible therapeutic intervention for both type 1 and type 2 diabetes, latent autoimmune diabetes of adults, gestational diabetes, hypoglycaemia, and neuropathy, as shown by its beneficial effect on diabetes development, degree of insulitis in NOD mice and positive effect on non-fasted blood glucose etc.

**Technology Description/Technology Summary**
Experimental tests in diabetes-prone NOD mice showed that L-serine prevented diabetes and had an overall beneficial effect on blood glucose homeostasis. Thus, the invention relates to a method of prophylactic treatment of type 1 diabetes and related disorders in subjects at risk of developing diabetes by treatment with the non-essential amino acid L-serine.

**Development Phase/Current state**
Experimental tests with L-serine has been conducted on diabetes-prone NOD mice, which have demonstrated promising effects regarding prevention of type 1 diabetes and improved glucose homeostasis. We propose that a randomized, double-blind, placebo-controlled study is conducted to investigate the diabetes alleviating effect of treatment with L-serine in humans.

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**Fig 1. L-serine reduces autoimmune diabetes incidence and insulitis score in NOD mice.** (a) Kaplan-Meier survival curves showing diabetes incidence up to 45 weeks of age. Blood glucose was measured once a week and diabetes diagnosis were based on two blood glucose measurements with an interval of two days ≥121mM control (n = 49) and L-serine (n = 30), p = 0.02. (b) Insulitis score in 13-week-old NOD mice, 30 islets were scored per mouse, n = 5. Shown is mean ± SEM, p = 0.02. (c) Percentage distribution of insulitis levels 0 (white), 1 (light grey), 2 (grey), 3 (dark grey), and 4 (black), p = 0.03, for insulitis level 4. (d) Representative images of insulitis level in control and L-serine mice. Scale bar, 50 μm. Control is shown in red and L-serine in blue. Statistical tests: Mantel-Cox log-rank test (a) and unpaired two-tailed Student’s t-test (b, c), *p < 0.05.