

# D-serine Treatments

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## Technology description

### **Elevated D-serine Correlated to Lower Blood Sugar, More Insulin**

Systemic administration of D-serine has been shown to alter blood sugar levels in mice. An acute, high-dose injection of D-serine or a genetic mutation leading to endogenously elevated levels of D-serine resulted in hypoglycemia compared to controls in mice. Human islets secreted more insulin in response to glucose when exposed to D-serine under target activating conditions. Prolonged high-concentration exposure to D-serine led to reversible hyperglycemia in mice and a loss of islet viability. These results implicate D-serine in the mechanisms of blood sugar regulation and in the symptoms/etiology of progressive forms of diabetes.

### **NMDA Receptors Activated by D-serine**

NMDA receptors are widely expressed in the brain as well as in some peripheral tissues, including the pancreas. To be activated, NMDA receptors need an agonist, like glutamate, and a co-agonist. D-serine is the strongest natural co-agonist activator of NMDA receptors currently identified by scientists. Because insulin-producing beta cells in the pancreas contain NMDA receptors, it is expected that D-serine treatments can be used to manipulate these pancreatic cells in order to change insulin release and blood sugar levels.

### **D-serine and Diabetes**

D-serine treatments could be used to control type II diabetes. A patient could take a D-serine pill before meals to improve glucose tolerance or with another diabetic therapy to improve hyperglycemic control and/or to minimize the dose or frequency of insulin injections. Genetic mutations to D-serine regulatory genes or to D-serine's co-agonist NMDA receptor target site could be used to identify individuals with diabetic susceptibility and to predict diabetic subtypes or assess treatment approach. In clinical trials where D-serine was tested as a treatment for schizophrenia and other neurological disorders, results indicated that oral D-serine treatments have a low level of side effects at biologically active doses.

## Advantages

Can be used to manipulate blood sugar and islet insulin secretion

Absorbed into body through normal nutrient transport mechanisms

D-serine and NMDAR regulatory genes could indicate diabetic susceptibility

Clinical trials indicate D-serine is safe for biologically effective levels

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