GLUTAMIC ACID DECARBOXYLASE (GAD65)

**FUNCTION:**
Glutamic Acid Decarboxylase (GAD) a neuronal protein is an enzyme responsible for the conversion of the excitatory neurotransmitter glutamate to the inhibitory neurotransmitter γ-aminobutyric acid (GABA). GAD is also expressed by pancreatic beta cells.

**ANTIBODIES APPEAR:**
- Battan disease
- Celiac disease
- Cerebellar ataxia
- Gluten sensitivity
- Polyendocrine autoimmune syndrome
- Stiff-person syndrome
- Type 1 Diabetes

**KNOWN CROSS-REACTIONS:**
- Casein
- Coxsackievirus

**CLINICAL SIGNIFICANCE:**
This enzyme is the major auto-antigen in Type I Diabetes. Researchers speculate that as a target antigen, GAD65 may directly, or indirectly, produce the T cell response cascade that results in insulin-dependent (type 1) diabetes mellitus. In addition to patients with autoimmunity against islet cell antigen (Type I Diabetes), patients with neurological disorders (low GABA) may also produce high levels of antibodies against GAD. Anti-GAD autoantibodies may result in an excess of excitatory neurotransmitters, which can lead to seizures. Due to cross-reactivity between gliadin and casein, patients with antibodies against GAD65 should implement a dairy-free diet. Additionally, in a study of Celiac patients, 60% of the participants with Celiac disease produced GAD65, which may explain the relationship between Celiac disease and type-1 diabetes.

**References:**