Cyrex™ Laboratories

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[6]
Celiac disease[3]
Cerebellar ataxia[4]
Gluten sensitivity[3]
Polyendocrine autoimmune syndrome[2]
Stiff-person syndrome[2]
Type 1 Diabetes[2 4 7]

KNOWN CROSS-REACTIONS:

Casein,[1] Coxsackievirus [5]

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.[7] 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.[2 4 6] Anti-GAD autoantibodies may result in an excess of excitatory neurotransmitters, which can lead to seizures.[5] Due to cross-reactivity between gliadin and casein,[1] patients with antibodies against GAD65 should implement a dairy-free diet. Additionally, in a study of Celiac patients,[3] 60% of the participants with Celiac disease produced GAD65, which may explain the relationship between Celiac disease and type-1 diabetes.

References:

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2. Ellis TM and Atkinson MA. The clinical significance of an autoimmune response against glutamic acid decarboxylase. Nat Med, 1996; 2:148-153.
3. Hadjivassiliou M et al. Gluten sensitivity: from gut to brain. Lancet Neurol, 2010; 9:318-330.
4. Honnorat J et al. Cerebellar ataxia with anti-glutamic acid decarboxylase antibodies. Arch Neurol, 2001; 58:225-230.
5. LeRoth D et al (eds.). Diabetes Mellitus (3rd ed.). Lippincott Williams & Wilkins: Philadelphia, PA; 2004.
6. Pearce DA et al. Glutamic acid decarboxylase autoimmunity in Batten disease and other disorders. Neurology, 2004; 63:2001-2005.
7. Wilson SS et al. Therapeutic alteration of insulin-dependent diabetes mellitus progression by T cell tolerance to glutamic acid decarboxylase 65 peptides in vitro and in vivo1. J Immunol, 2001; 167:569-577.

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