# Diagnosing and Predicting Type 1 Diabetes - Identifying Role of Chemistry-Islet Autoantibodies

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**Julie McDowell:**

Distinguishing between type one and type two diabetes is critical because delayed diagnosis of type one diabetes is associated with 20% or more risk of diabetic ketoacidosis, a major cause of death in children. Differentiating between type one and type two diabetes is also extremely important for choice of appropriate therapy. While the clinical presentation of a patient may not allow an unambiguous discrimination between type one and type two diabetes, the presence of one or more islet autoantibodies can support the diagnosis of type one diabetes. According to Dr. William Winter, the director of the UF Health Pathology Laboratories Endocrinology unit, because islet autoantibodies can also predict the development of type one diabetes, once safe and effective therapies are available to prevent this disease, islet autoantibody testing will become routine in medical practice. As Dr. Winter explains in this CAPcast. Dr. Winter also led the development of a clinical pathology improvement program, or CPIP, course on this topic. Dr. Winter, can you start us off by providing an explanation of exactly what islet antibodies are and what they do?

**Dr. William Winter:**

Islet autoantibodies are predominantly IgG autoantibodies that are commonly detected prior to and at the time of onset of type one diabetes. One or more islet autoantibodies are found in more than 95% of persons with new onset type one diabetes.

**Julie McDowell:**

And what are the specific types of islet antibodies?

**Dr. William Winter:**

There are five clinically important islet autoantibodies: islet-cell cytoplasmic autoantibodies, ICA, that are detected by indirect immunofluorescence; then there's insulin autoantibodies, IAA; glutamic-acid decarboxylase autoantibodies, referred to as GADA, G-A-D-A; insulinoma-associated2 autoantibodies, I-A-2-A; and then lastly, zinc-transporter8 autoantibodies, Z-N-T-8-A. Islet-cell cytoplasmic autoantibodies were the first islet autoantibody described. They were first discovered and published in 1974.

**Julie McDowell:**

And why would islet antibodies be measured?

**Dr. William Winter:**

The presence of islet autoantibodies in a person with diabetes identifies type one diabetes, which is caused by autoimmune beta cell destruction. The diagnosis of type one diabetes has major implications, as you mentioned, for the choice of therapy. That is, persons with type one diabetes are always treated with insulin. Recognition of associated comorbidities, for example, other autoimmunities like thyroid autoimmunity, gastric parietal cell autoimmunity, adrenal autoimmunity, and celiac disease. The diagnosis has implications for diet and weight management and prognosis. If the diagnosis of type one diabetes is not in doubt, islet autoantibody testing is not required.

For example, a lean child with new onset diabetic ketoacidosis, most likely has type one diabetes, and we wouldn't advise islet autoantibody testing. However, testing for islet autoantibodies can be helpful when the differentiation of type one diabetes versus type two diabetes is unclear in an individual patient. For example, a teenager that has a high BMI, but presents with DKA, does this person have type one or type two? And the presence of islet cell autoantibodies would confirm that it is autoimmune etiology. In the future when safe and effective therapies are available to prevent type one, individuals at risk for type one can be detected by screening the general population for islet autoantibodies.

**Julie McDowell:**

And where can a pathologist or a laboratory send samples for islet autoantibody testing?

**Dr. William Winter:**

Islet autoantibody testing is generally not available in local or hospital laboratories. It could be considered specialized testing. It is available from reference laboratories and a variety of university laboratories. In choosing a laboratory to perform islet autoantibody testing, the pathologist would want to confirm that that laboratory indeed has expertise in this specialized type of testing.

**Julie McDowell:**

Finally, Dr. Winter, when ordering islet autoantibody testing, should the physician order selected autoantibody testing, or a panel of autoantibody testing?

**Dr. William Winter:**

If the laboratory offers a waterfall scheme for measuring islet autoantibodies, initial testing could involve testing for glutamic acid, decarboxylase, and insulinoma associated to autoantibodies. If both are negative, the remaining islet autoantibodies could be run. It's also important to note that islet autoantibodies that are against insulin, the insulin autoantibodies, are uncommon in adults with new onset type one, so we don't advise testing adults for insulin autoantibodies.

**Julie McDowell:**

Well, thank you, Dr. Winter. As mentioned earlier in the episode, Dr. Winter led the development of a CPIP course on this topic entitled "Chemistry Islet Autoantibodies, and the Diagnosis and Prediction of Type one Diabetes". To learn more about this course, please visit estore.cap.org, and type in the course title in the search function.

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