**TYPE 1 DIABETES (INSULIN DEPENDENT DIABETES MELLITUS OR IDDM)**

The Role of Autoantibodies in Disease Development and Prediction

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Type 1 (autoimmune) diabetes is caused by autoantibodies that target the insulin-secreting beta cells of the pancreas. Without adequate insulin, blood sugar levels rise.

**Type 1 Diabetes**

Juvenile or insulin-dependent diabetes mellitus (IDDM) is also known as type 1 or autoimmune diabetes. Type 1 diabetes is responsible for most cases of diabetes in children up to the age of 12 years. In addition, type 1 diabetes accounts for about 10 percent of all cases of diabetes in the United States.

Type 1 diabetes is characterized by the production of autoantibodies that target the insulin-secreting beta cells of the pancreas. This form of diabetes is often found in association with other autoimmune disorders, especially other endocrine disorders, particularly those affecting thyroid and adrenal function.

**The Role of Beta Cell Antibodies**

Antibodies that target the body’s own tissues and cells are known as autoantibodies. The presence of beta cell or pancreatic islet cell autoantibodies confirms that type 1 diabetes is autoimmune in origin. The disease process in IDDM is primarily caused by the destruction of pancreatic beta cells.

This cell destruction is thought to result mainly from the action of T-lymphocytes, the key players in autoimmune disease development. The beta cell autoantibodies that characterize type 1 diabetes may not be responsible for cell destruction. Instead, these antibodies are thought to signal a T-cell mediated immune response that sets the stage for beta cell destruction.

**Other Antibodies in Diabetes**

Islet cell antibodies were the first autoantibodies discovered in patients with diabetes. However, antibodies specific to the beta cell antigens that make up islet cells are more specific. Antibodies to insulin and proinsulin also occur in diabetes. Antibodies to the enzyme glutamic acid decarboxylase (GAD), which is found in nervous system and pancreatic cells, are also seen in diabetes. GAD antibodies were first demonstrated in patients with Stiff-Man syndrome, a disorder sometimes seen in patients with diabetes. Antibodies to the islet cell protein tyrosine phosphatase (IA-2) and phogrin, are also seen in diabetes.
Who Gets Type 1 Diabetes?

Most people who develop type 1 diabetes do not have a family history of type 1 diabetes. However, there is a definite genetic component. Individuals who have first degree relatives with diabetes are more than 10 times as likely to develop diabetes than people in the general population. In identical twins, who have an identical genetic profile, the rate of both twins developing type 1 diabetes is 30 percent. People with the immune system genes HLA-DR3 and HLA-DR4 have the greatest risk of developing diabetes. A number of other immune system genes have also been found to contribute to diabetes. Within families, the strongest predictor for susceptibility to diabetes is the presence of beta cell or islet cell autoantibodies.

Disease Development

Studies conducted in North America and Europe have shown that autoantibody production in diabetes occurs in the first years of life. These antibodies typically develop many years before the development of clinical diabetes. Studies show that 90 percent of children with

1. islet or beta cell antibodies
2. GAD antibodies
3. IA-2 antibodies

go on to develop diabetes. If two antibodies are present 75 percent of children develop diabetes within the next 15 years.

Antibody Testing

Tests for diabetes antibodies are typically used to confirm type 1 diabetes in patients newly diagnosed with diabetes. Testing for diabetes autoantibodies is reported to also be a valuable indicator of the impending development of diabetes. However, to date, there are no successful treatment interventions that have been found to delay the onset of diabetes. Several medical centers are currently conducting studies intended to find treatment interventions. When treatment interventions are found, testing for diabetes antibodies to predict disease will be routine disease prevention tests.

Resource:


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