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Dietary gluten and the development of type 1 diabetes

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Gluten proteins differ from other cereal proteins as they are partly resistant to enzymatic processing in the intestine, resulting in a continuous exposure of the proteins to the intestinal immune system. In addition to being a disease-initiating factor in celiac disease (CD), gluten-intake might affect the type 1 diabetes development. Studies in animal models of type 1 diabetes have documented that the pathogenesis is influenced by diet. Thus, a gluten-free diet largely prevents diabetes in non-obese diabetic mice while a cereal-based diet promotes diabetes development. Furthermore, human studies have established a connection between timing of early infant diets containing gluten and the development of autoantibodies against the pancreatic islets, while newly diagnosed type 1 diabetes patients benefit from a gluten-free diet. Finally, there is evidence that the intestinal immune system plays a primary role in the pathogenesis of type 1 diabetes, as diabetogenic T cells are initially primed in the gut, islet-infiltrating T cells express gut-associated homing receptors, and mesenteric lymphocytes transfer diabetes from NOD-mice to NOD/scid-mice. Gluten may affect the pathogenesis of type 1 diabetes by influencing immune cell populations or by modifying the cytokine/chemokine pattern towards an inflammatory profile. This supports an important role for gluten-intake in the pathogenesis of type 1 diabetes and further studies should be initiated to clarify whether a gluten-free diet could prevent disease in susceptible individuals or be used with newly diagnosed patients to stop disease progression.

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