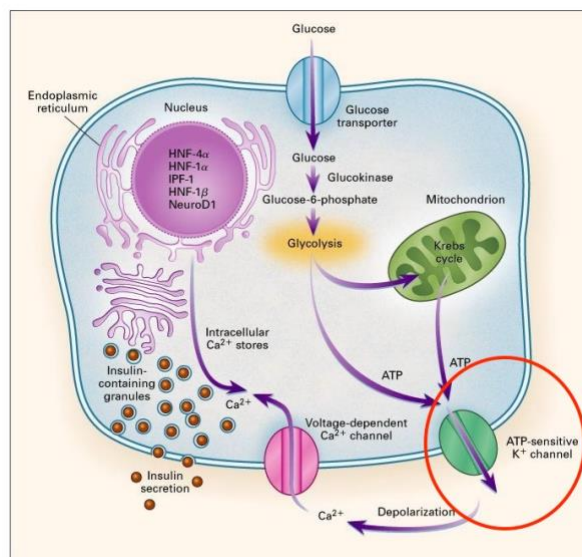


KCNJ11-related Neonatal Diabetes



Overview:

Diabetes caused by genetic changes (sometimes called ‘mutations’) in the *KCNJ11* gene is one of the most common types of neonatal diabetes. Neonatal diabetes means diabetes diagnosed under approximately 6-12 months of age. *KCNJ11*-related neonatal diabetes can be either permanent or transient. Permanent means the high blood sugars do not go away over time. Transient means the high blood sugars may appear in infancy, but then go away for several years, and the high blood sugars often come back later in life. The *KCNJ11* gene contains instructions for making parts of an important protein found in beta cells. Beta cells are cells in the pancreas that make insulin and help to keep blood sugars in a normal range. This important protein is an ATP-sensitive potassium (K-ATP) channel that is imbedded on the beta cell membrane. It opens and closes depending on the amount of glucose in the bloodstream. Some people think of this like a door that can be opened and closed depending on the amount of glucose, or sugar, in the blood.

Normally, an increase in glucose causes the K-ATP channel (or ‘door’) to close, triggering the release of insulin out of the beta cell into the bloodstream and helping to regulate blood sugar levels. Genetic changes in the *KCNJ11* gene can result in K-ATP channels (or ‘doors’) that do not close. This causes reduced insulin release from the beta cells and impaired blood sugar regulation.

The K-ATP channel (or ‘door’) is circled in red in the above picture. This picture illustrates a beta cell and the insulin release process.

These genetic changes in *KCNJ11* can occur spontaneously, such as when a person does not inherit the change from their parent. Sometimes the genetic changes are passed on from a parent to a child. If a parent has *KCNJ11*-related neonatal diabetes, there is a 50% chance that their child will inherit the genetic change and be at risk of developing diabetes during the first year of life.

Presentation:

People with *KCNJ11*-related neonatal diabetes are typically diagnosed with high blood sugars before 6-12 months of age. Oftentimes, this is misdiagnosed as Type 1 diabetes. Some *KCNJ11* genetic changes can also be associated with mild to severe neurodevelopmental delays. Early diagnosis and appropriate treatment are very important.

Treatment:

Certain oral medications (or 'pills') called sulfonylureas target the K-ATP channel ('door') in the beta cell and helps to close the channel allowing insulin to be released. Many patients with *KCNJ11*-related neonatal diabetes can be successfully treated with sulfonylurea medications.

Inheritance:

Finding out someone has *KCNJ11*-related neonatal diabetes may have implications for other family members as those family members may also have *KCNJ11*-related neonatal diabetes. A child of a person with *KCNJ11*-related neonatal diabetes will have a 50% chance of inheriting the genetic change and developing diabetes during the first year of life.

Research:

If you or a family member have *KCNJ11*-related neonatal diabetes, or think you may have it, then please contact us at monogenicdiabetes@uchicago.edu to learn more about our studies.