

## **2000 Workshop - Type IX**

### **GSD IX (Phosphorylase Kinase Deficiency) Workshop Report**

At Oxford Belfrey Hotel 2000 AGSD(UK) Family Conference

A clear understanding of phosphorylase kinase deficiency

Dr Philip Lee, Consultant in Metabolic Medicine led the second Type IX workshop. Four families attended.

The interactive session began by asking everyone for a question they would like answered by the end of the morning.

Dr Lee then presented the participants with a series of questions. The idea being that we would come up with answers to our own questions!

#### **What is glycogen?**

Stored form of glucose

#### **Where is it stored?**

Most tissues, particularly muscles and liver

#### **What is it used for?**

Glycogen is broken down to glucose when the body needs energy

#### **How can it be released for use?**

Various enzymes -such as phosphorylase, phosphorylase kinase and debrancher enzyme break glucose molecules off the glycogen, so it can be used by the body. When these enzymes no longer function efficiently or are missing the various types of glycogen storage occur. In type IX only the phosphorylase enzyme is not functioning the other enzymes still function to breakdown glycogen for energy.

#### **How is it inherited? And how can others in the family be affected?**

(1) X-linked (affects boys)- mutation in the X chromosome in the mum for the PHKA2 gene that encodes the alpha subunit of the phosphorylase kinase enzyme. Mums are the carriers.

XX Mum (Carrier)

XY Dad

XX	XY	XX	XY
Unaffected	Unaffected	Carrier	Affected
Girl	Boy	Girl	Boy

50% of daughter will be carriers and 50% of sons will be affected.

(2) Autosomal recessive (affects girls and boys)

Both mum and dad are carriers, one in four of the children are likely to be affected.

#### **What are the different types of x-linked phosphorylase kinase deficiency?**

- X - linked glycogenosis is divided into two types. Type I - where there is no enzyme activity in either the red blood cells or the liver. Type II -where there is normal enzyme in red blood cells but decreased activity in the liver. It is these variations that lead to the wide clinical variation.

#### **How is it diagnosed?**

- Enzymes measured in the red blood cells and liver
- Liver biopsy
- Increased awareness

The Mutation in gene can be identified - it is only in very recent years that the structure of gene been determined.

What effect does it have on those affected?

- Low blood sugar
- enlarged liver
- short stature
- delayed puberty
- raised liver enzymes (transaminases)
- abnormal blood lipids - cholesterol

### **How GSD IX is treated and monitored**

#### **How does cornstarch work?**

- similar to glycogen in that the starch is a slowly releasing glucose for the body
- in the digestive tract it needs an enzyme called amylase to breakdown the starch
- cornstarch given to speed up growth and help provide stable constant glucose levels

#### **How long does it last?**

- depends on activity

#### **What blood tests are performed?**

- lipids
- LFTS

#### **How is the abdominal ultrasound helpful?**

- Monitors condition of the liver (i.e. fatty deposits)
- And checks on health of the vessels supplying liver

#### **The future?**

Enzyme replacement or gene therapy probably not appropriate as the condition is relatively mild. The long term outlook is good with normal life expectancy. As this is the most common type of Glycogen storage disease increased awareness amongst the medical profession to ensure early diagnosis and implement effective treatment, with long term follow-up into adulthood.