Frequently Asked Questions

1. **If no members of my family have any type of IEM can I still have a child with the condition?**
   Yes. Due to the way the diseases are inherited, it is possible for the defective gene to be present in the family without anyone showing symptoms (carriers). Hence, you may not be aware of a family history.

2. **Since IEM are due to deficiencies in certain types of proteins, will eating more food with protein help?**
   No. Protein from food cannot replace the lacking/ defective enzymes in the body. In some IEM, eating excessive food with protein may be harmful. It is advisable to follow a specific diet prescribed by your metabolic physician and dietitian.

3. **Since IEM are genetic conditions, is it possible to have more than one child with the condition?**
   Yes. If parents are carriers of the gene change, there are specific risks for subsequent pregnancies depending on the mode of inheritance of the disorder. On the other hand, parents who are not carriers are very unlikely to have more children affected by the disorder.

4. **Is it important that my child adheres to the dietary requirements advised for him? How do I ensure that he sticks to it at school?**
   Yes, it is very important that your child complies with the dietary requirements advised for him. Failure to do so may result in complications and adverse outcomes. Involving your child in the management of his condition from an early stage would allow him to know what to do and be responsible for himself. However, it may be necessary to seek assistance from the school especially when involving very young children.

5. **Do people with IEM have a shortened lifespan?**
   Some types of IEM cause premature deaths. However, medical advances have enabled the development of effective treatment and management which have resulted in many patients living longer lives.

References

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MALAYSIAN RARE DISORDERS SOCIETY

Rare Disorders Series:

Inborn Errors of Metabolism

What are Inborn Errors of Metabolism (IEM)?

IEM is a group of genetic disorders characterised by the inability of the body to break down (metabolise) food into energy and, make new building blocks for the organs in the body.

They are caused by changes (mutations) in specific genes, resulting in the body being unable to produce enzymes.

These enzymes function to metabolise food into energy by following specific metabolic pathways.
Each pathway involves many enzymes, with each playing a role to break down different by-products of food until it is finally turned into energy or made into specific body tissues.

When a change occurs in any of the genes producing an enzyme involved in a metabolic pathway, the enzyme produced will either be in reduced amounts, absent or defective.

This results in a block in the pathway, as the by-product cannot be further broken down due to the absence of the specific enzyme.

Over time, the by-product accumulates in the body and may affect the individual's health, growth and development in various ways and severity.
In addition, the body will also experience shortage of energy or building blocks needed by the cell to function due to absence of the specific enzyme.

Hundreds of IEM have been identified thus far. They are individually rare but collectively common.

Presentation of symptoms usually occurs in infancy, but can also occur at other times.

Patients are advised to consult a geneticist to obtain further information on disease progression of specific IEM.

Examples of IEM

Type of disorder	Name of disorder
Amino acid metabolism	- Phenylketonuria (PKU) - Maple Syrup Urine Disease (MSUD)
Carbohydrate metabolism	- Galactosemia - Congenital Disorder of Glycosylation (CDG)
Fatty acid oxidation	Medium Chain Acyl-CoA Dehydrogenase (MCAD) Deficiency
Lysosomal Storage	- Gaucher disease - Pompe disease
Urea Cycle	Ornithine Transcarbamylase (OTC) deficiency

Note: This table lists some of the more common IEM seen and is not exhaustive

Signs and symptoms

Signs and symptoms shown by affected individuals vary greatly according to type of disorder.

Suspicion of IEM may be raised when following symptoms are observed:

- Rapid deterioration in otherwise well infant
- Poor feeding, vomiting, lethargy and failure to thrive
- Regression in milestones
- Unusual urine or body odour
- Showing dislike towards certain food types

Some symptoms may be irregular, only appearing at certain times, such as during illnesses, changes in diet or exercise.

Testing

Diagnosis of a specific IEM is made after clinical suspicion based on history and physical manifestations is confirmed via a series of testing.

Testing includes urine and blood analysis for relevant biochemical compounds, enzyme assays and evaluation of affected tissues.

Genetic testing may also be offered for certain types of IEM.

Genetic counselling by qualified personnel is advised if there is a family history of any genetic condition and before any genetic testing is done.

Treatment and management

Treatment is administered to prevent further build up of harmful substances and to eliminate toxic compounds in the body.

Early diagnosis and treatment is crucial to prevent irreversible complications and damage which could be life threatening.

Many of those affected by IEM need to follow special dietary requirements which exclude food containing compounds that cannot be metabolised by the body.

IEM specialists often prepare treatment and emergency protocols which are specific to the needs of each individual.
This protocol should be kept by care givers to use in the event of illness.