

# TEMPLE



Tools **E**nabling **M**etabolic **P**arents **L**Earning

ADAPTED BY THE DIETITIANS GROUP

**BIMDG**

British Inherited Metabolic Diseases Group



BASED ON THE ORIGINAL TEMPLE WRITTEN BY  
BURGARD AND WENDEL  
VERSION 5, MARCH 2025

# TYR II

Supported by **NUTRICIA**  
as a service to metabolic medicine

# TEMPLE foreword

TEMPLE (Tools Enabling Metabolic Parents LEarning) are a set of teaching slides and booklets that provide essential information about different inherited metabolic disorders that require special diets as part of their management. These teaching tools are aimed at parents who may have an infant or child that has been recently diagnosed with a disorder. They are also useful when teaching children, extended family members, child minders, nursery workers and a school team.

They have been developed by a team of experienced clinical and research metabolic dietitians from the UK who are members of the British Inherited Metabolic Disease Group (BIMDG).

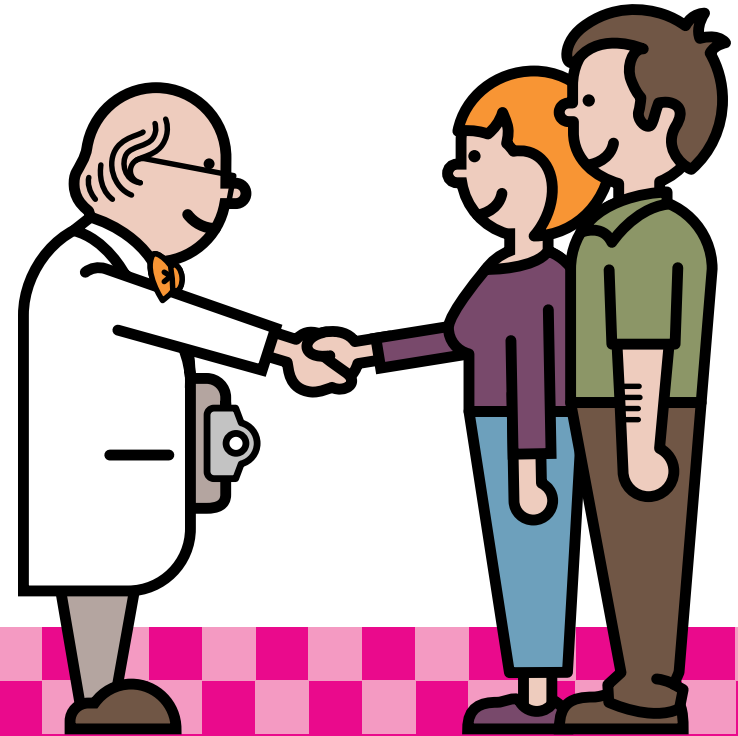
The team are Rachel Skeath, Karen van Wyk, Pat Portnoi and Anita MacDonald. The group is facilitated by Heidi Chan from Nutricia.

Each module produced is reviewed by a consultant clinician who is a member of the BIMDG.

**This teaching tool is not designed to replace dietary information that may be given by a dietitian in clinic.**

# Tyrosinaemia Type II (TYR II)

Information for families following  
a new diagnosis



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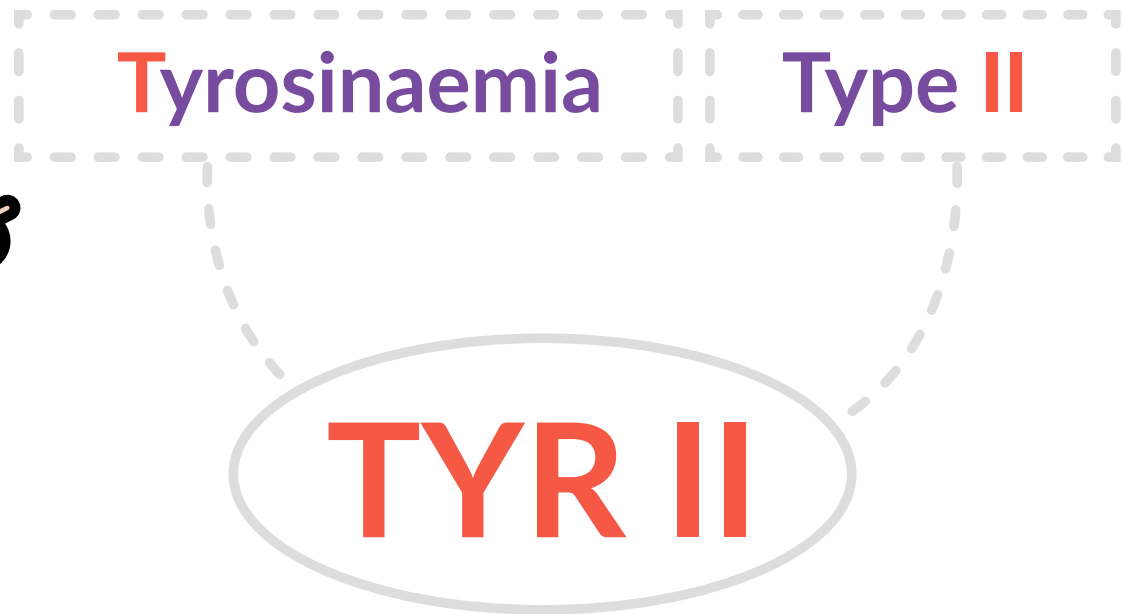
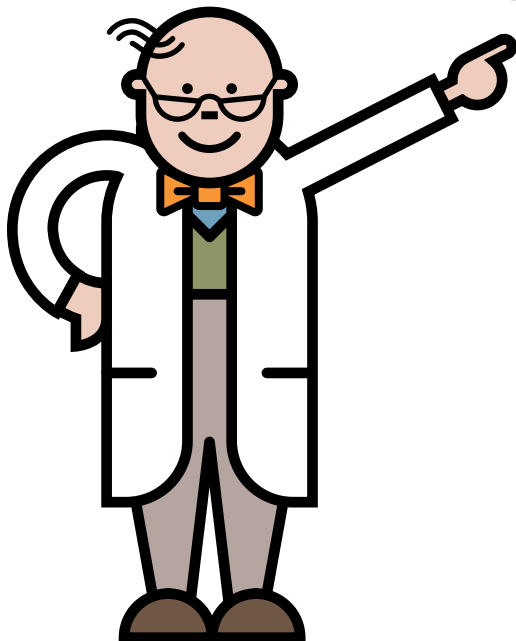


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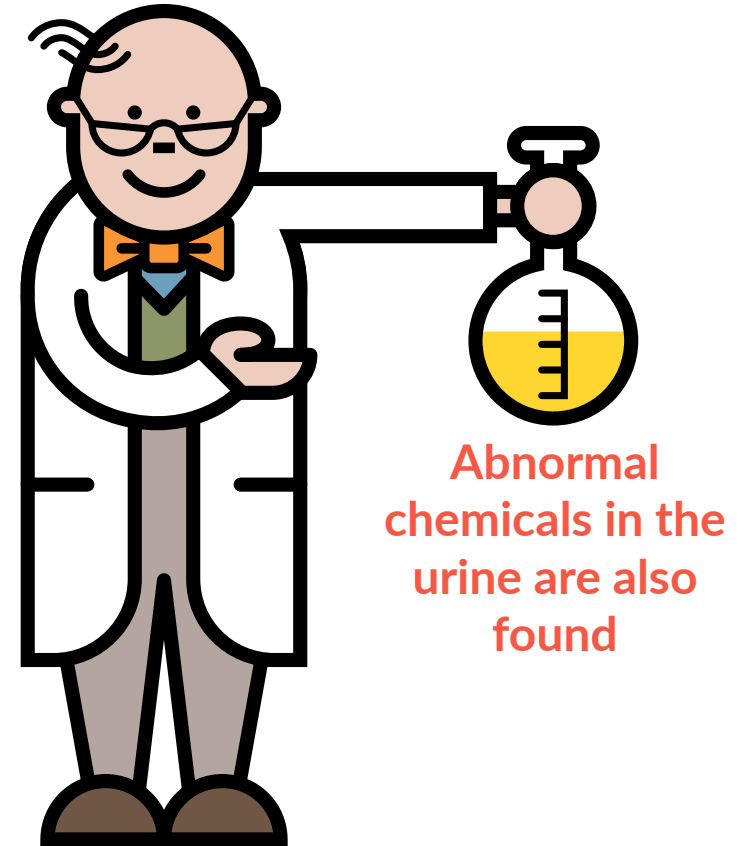
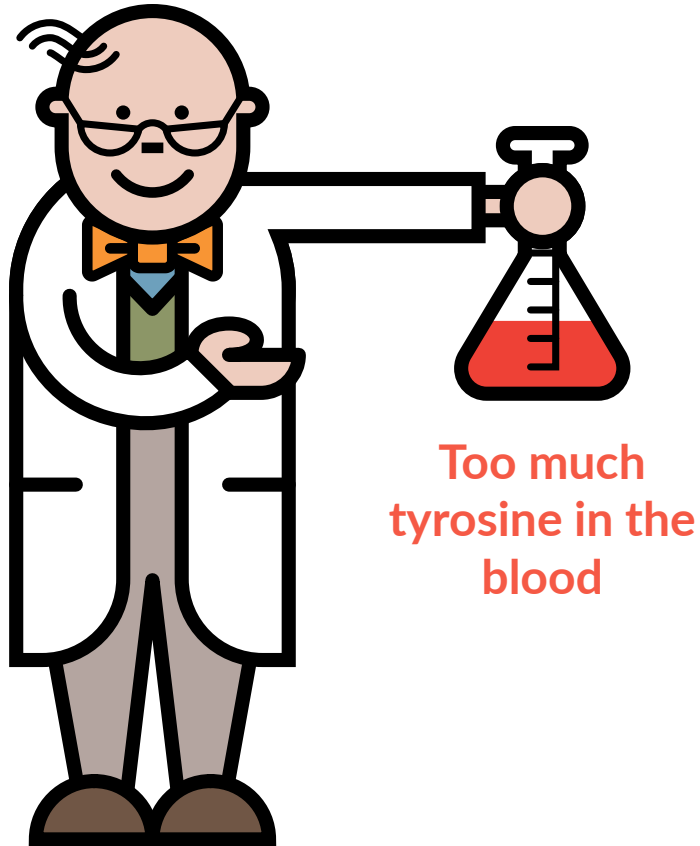
# What is TYR II?

TYR II stands for Tyrosinaemia Type II

It is an inherited metabolic condition



# What is TYR II?

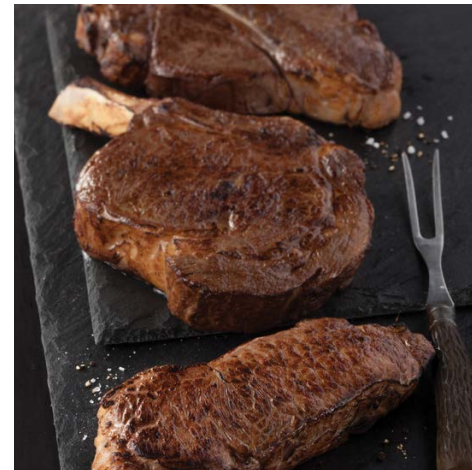
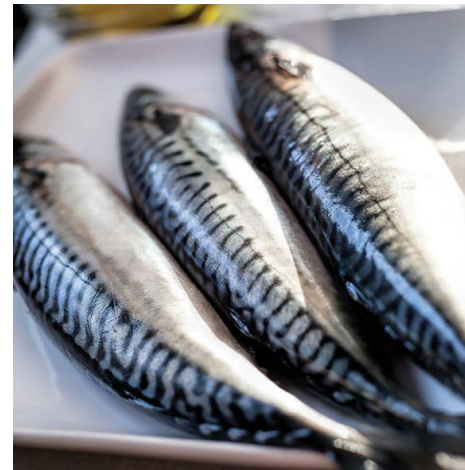
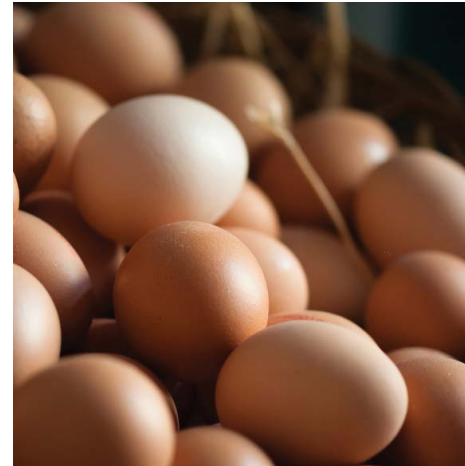


# TYR II and protein

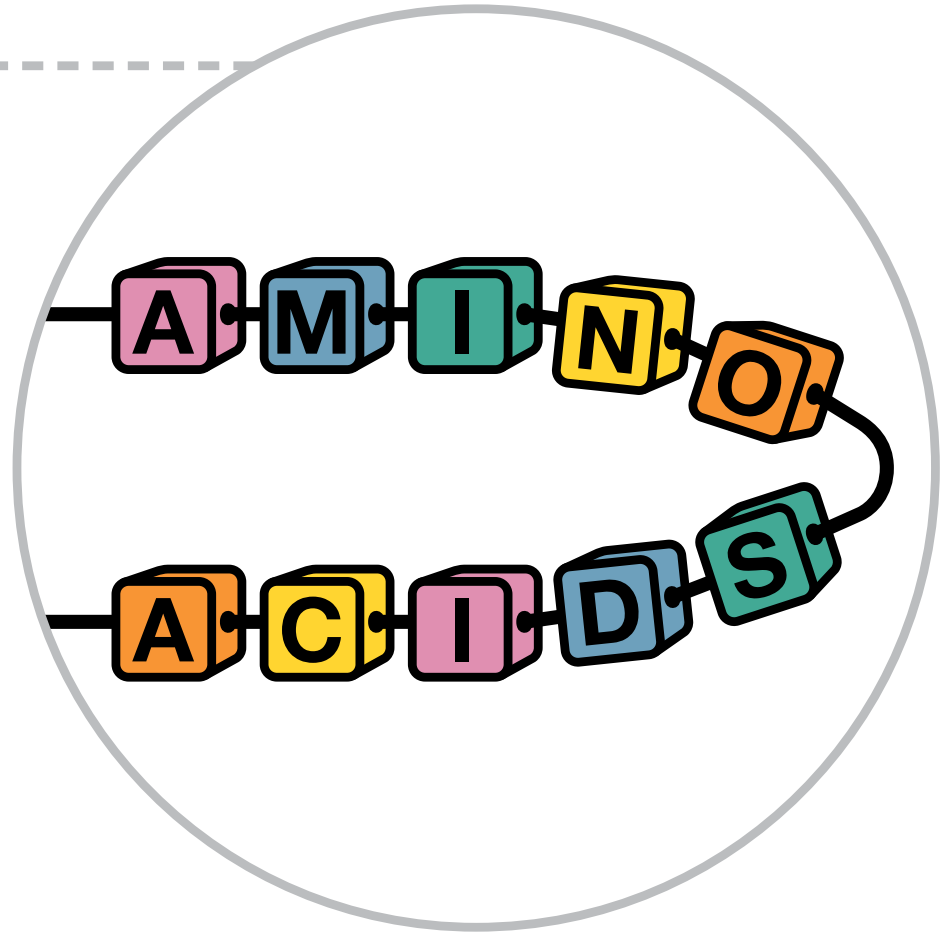
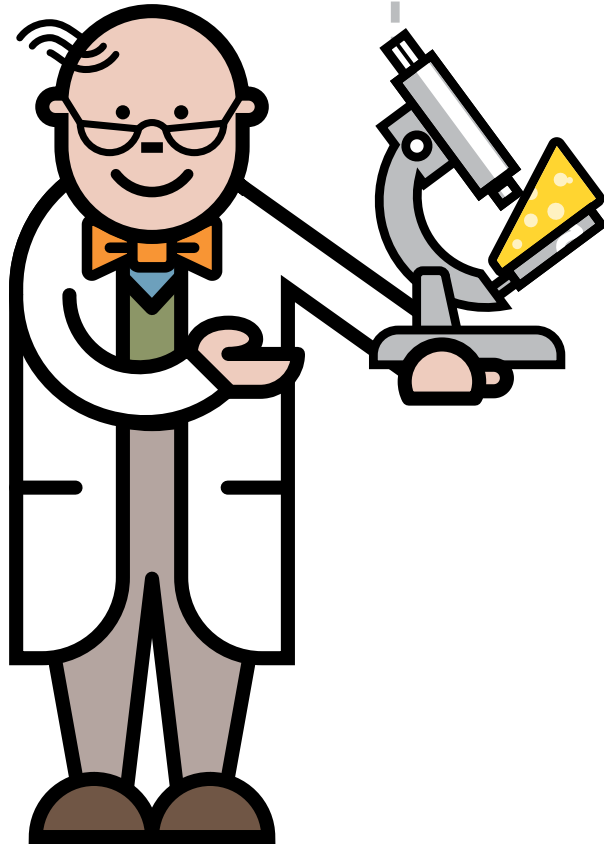
TYR II affects the way your baby breaks down protein

Many foods contain protein

The body needs protein for growth and repair



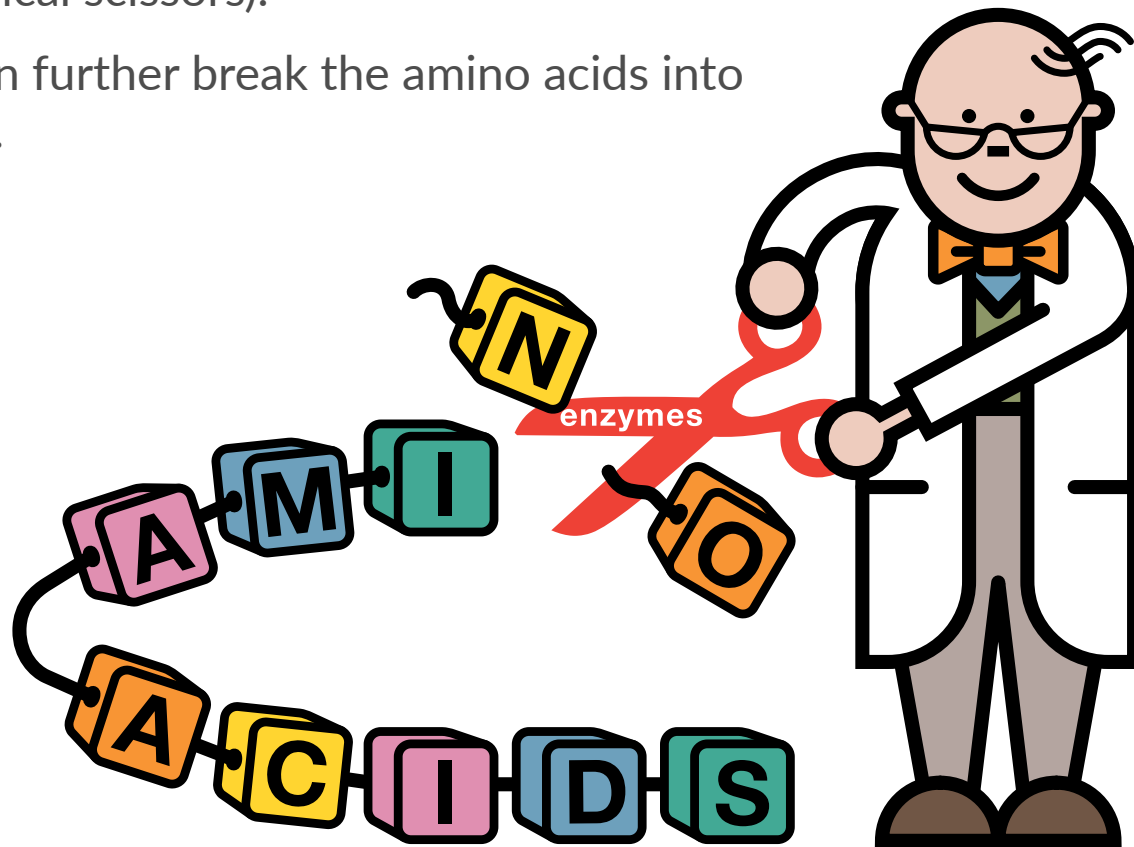
# What is protein?



# Protein and enzymes

Protein is broken down into amino acids (building blocks of protein) by enzymes (which are like chemical scissors).

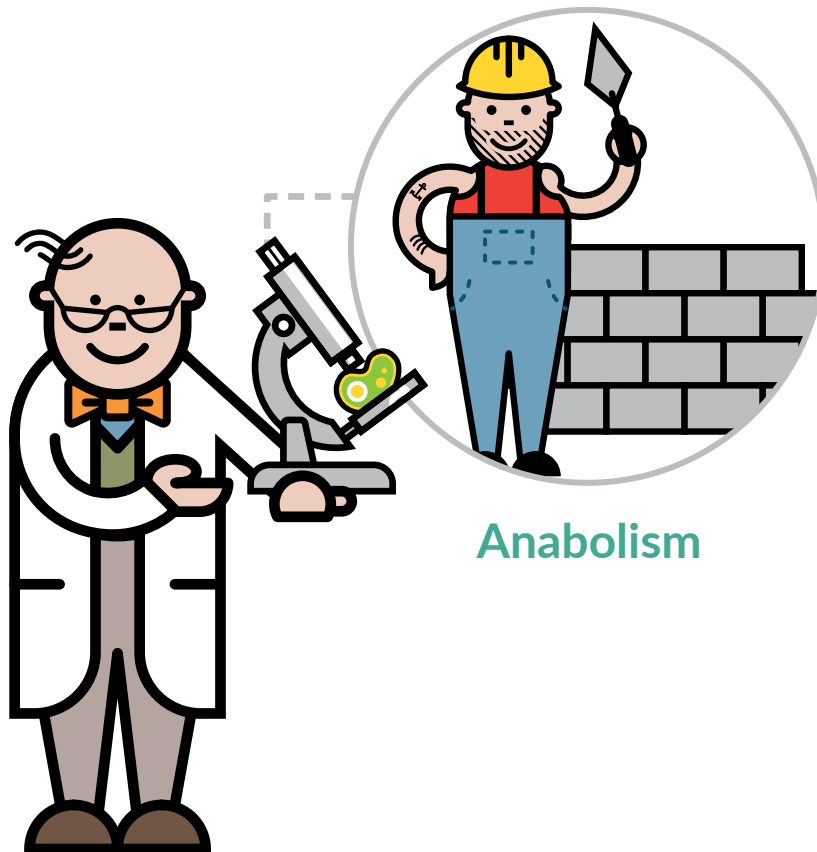
Enzymes then further break the amino acids into smaller parts.



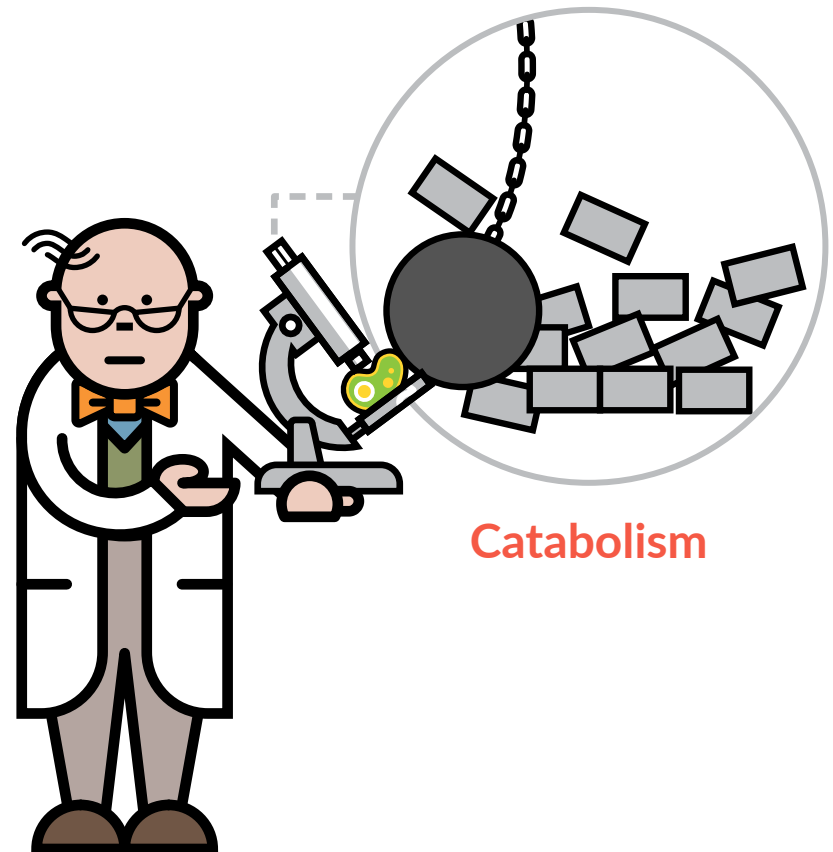


# Protein metabolism

**Metabolism** refers to the chemical processes that occur inside the cells of the body.



Anabolism

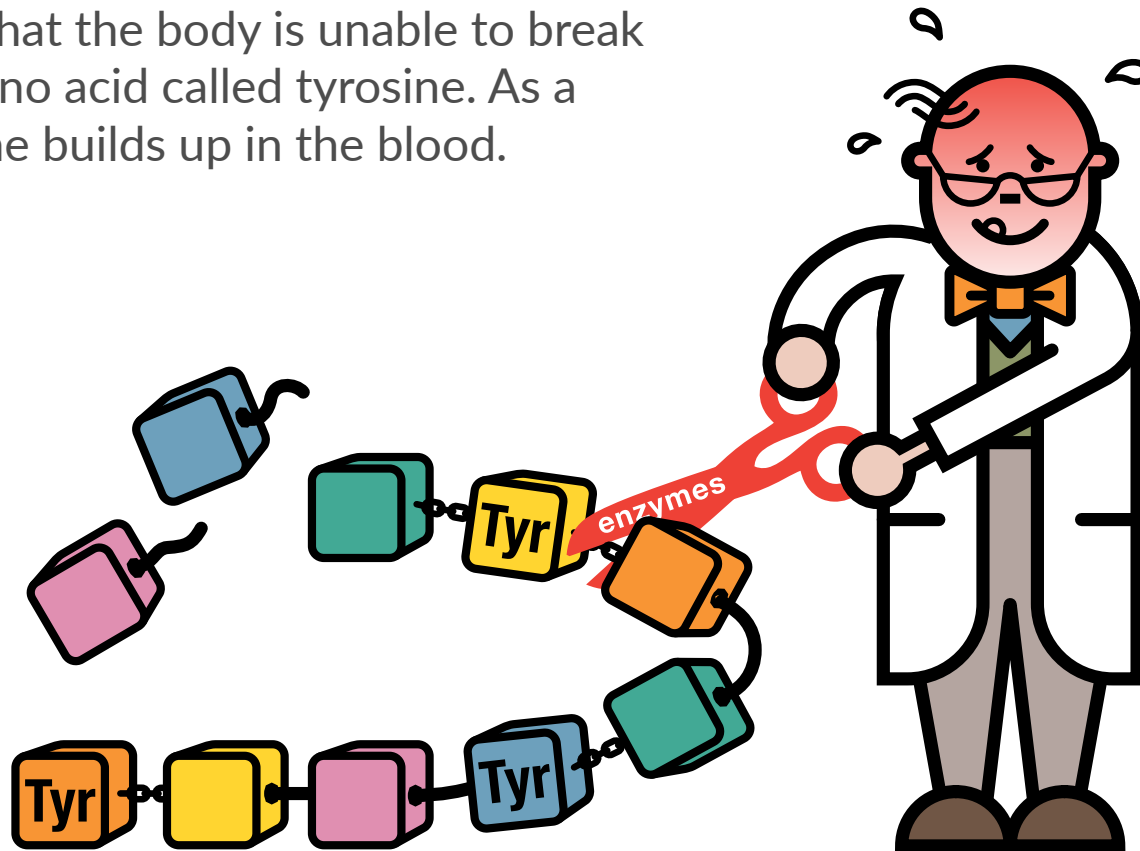


Catabolism

# What happens in TYR II?

In TYR II, the body lacks an enzyme called **tyrosine aminotransferase (TAT)**.

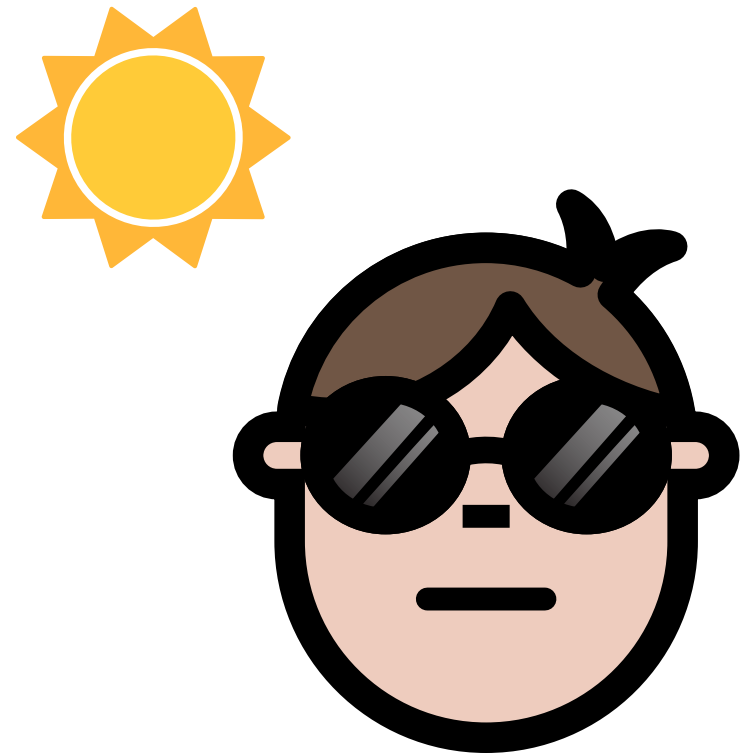
This means that the body is unable to break down an amino acid called tyrosine. As a result tyrosine builds up in the blood.



# What are the signs in TYR II?

Signs of TYR II usually begin in the first year of life but can occur at any age. Signs may include:

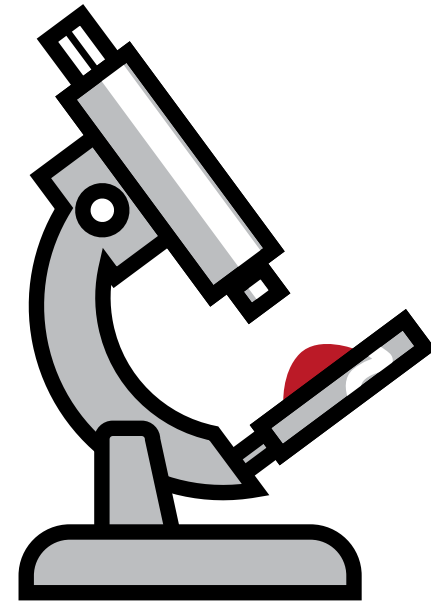
- Sensitivity to light (called photophobia)
- Eye redness
- Skin lesions on the hands and feet
- Behaviour problems
- Learning difficulties



# How is TYR II diagnosed?

TYR II is diagnosed by high levels of tyrosine in the blood and abnormal chemicals in the urine.

The diagnosis is confirmed by finding the mutation in the TAT gene.



# How is TYR II managed?

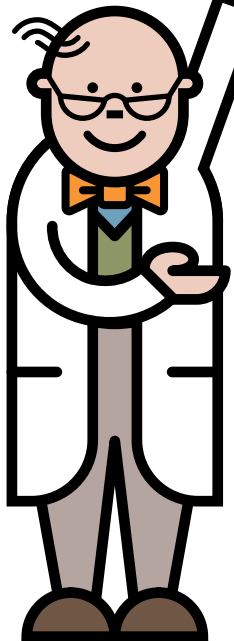
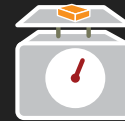
TYR II is managed with the following special diet:

Limited high protein foods

Measured amounts of tyrosine (protein) containing foods

A protein substitute. Sometimes extra phenylalanine is needed

Low protein foods



# How is TYR II managed?

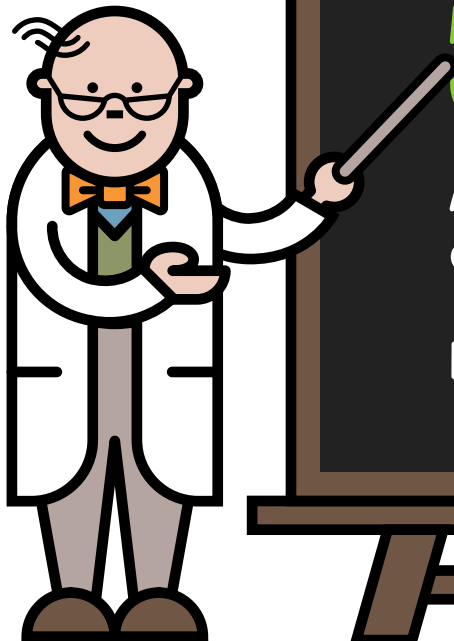
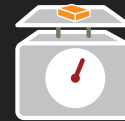
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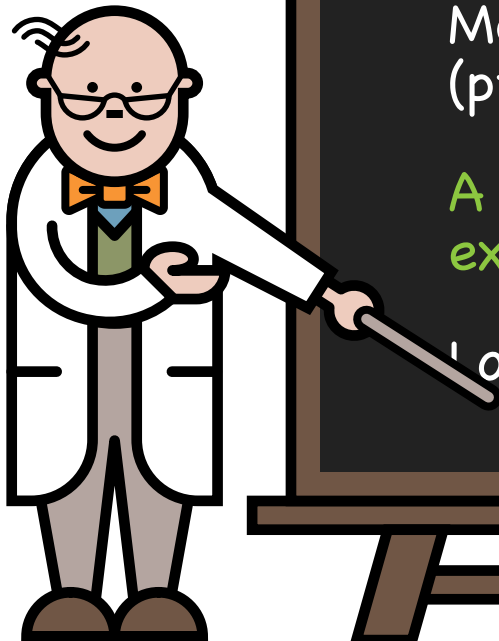
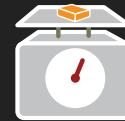
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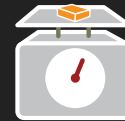
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# High protein foods

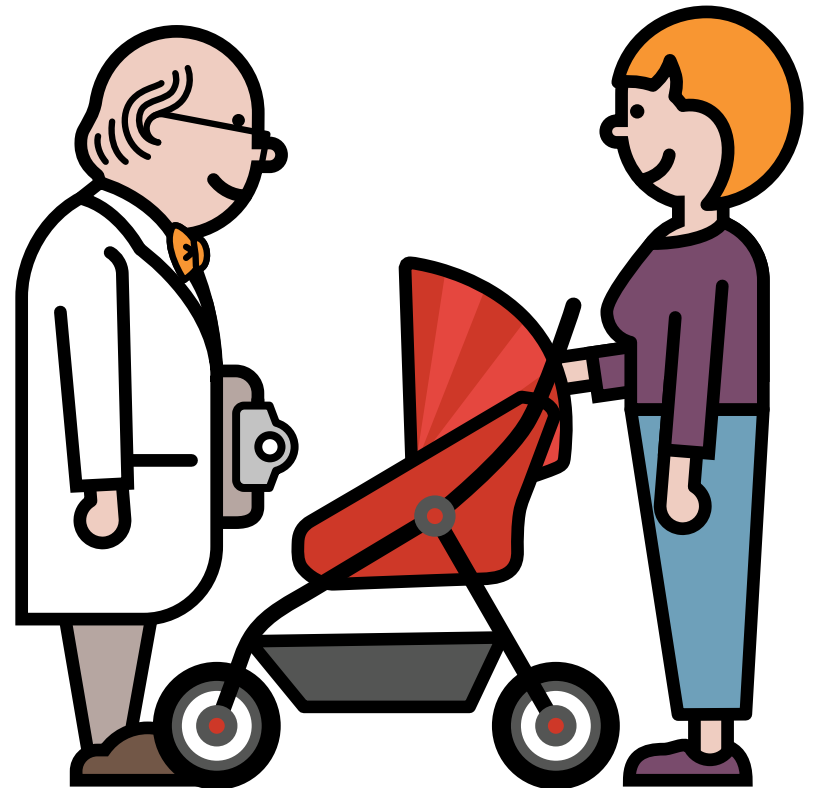
These foods are high in tyrosine (protein) and must be avoided: meat, fish, eggs, cheese, milk, bread, pasta, nuts, seeds, soya, Quorn and tofu.



# Measured tyrosine intake

In babies, a restricted amount of tyrosine (protein) is given from breast milk or measured amounts of infant formula.

The amount given will be monitored regularly by your specialist metabolic dietitian.

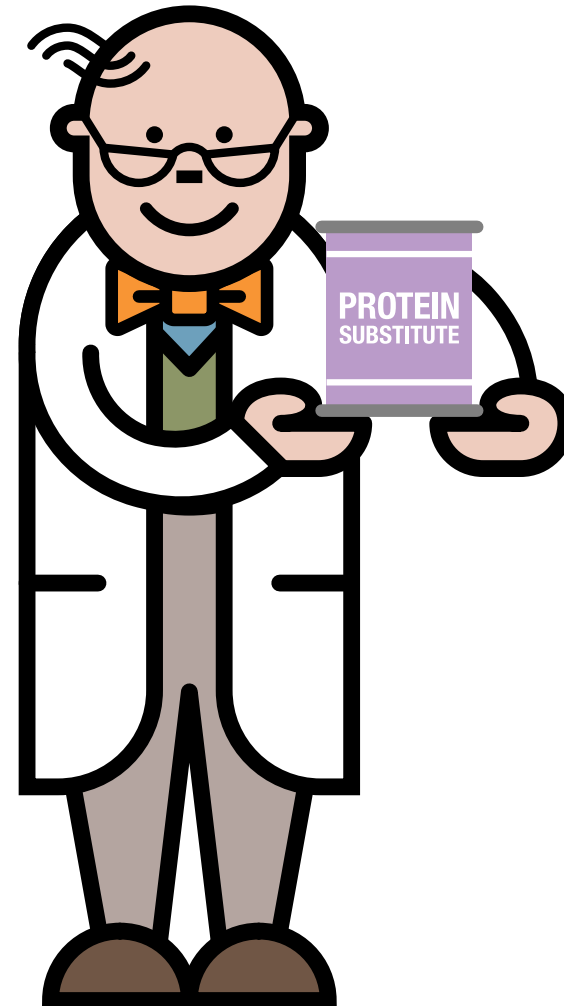


# Protein substitute

Protein substitute is essential for metabolic control.

It will help to meet your baby's protein, energy, vitamin and mineral requirements.

It is available on prescription.

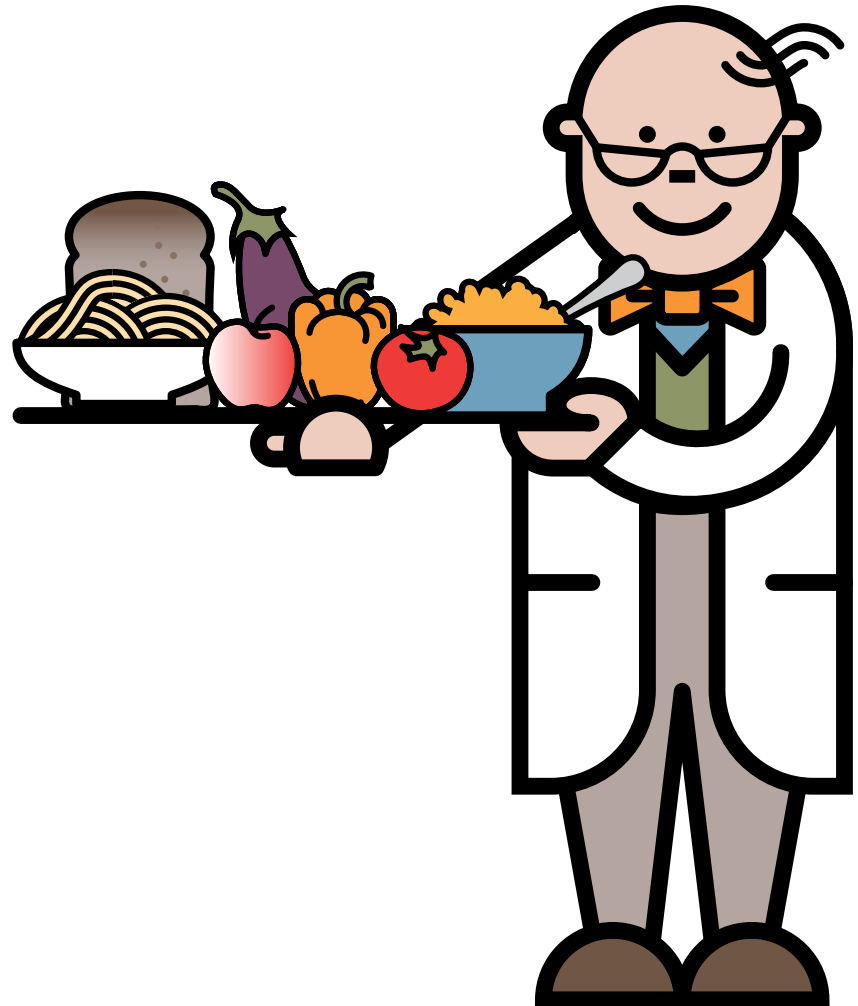


# Low protein foods

There are many low protein foods. These include fruit, many vegetables and prescribable low protein foods such as bread and pasta.

They provide:

- a source of energy
- variety in the diet



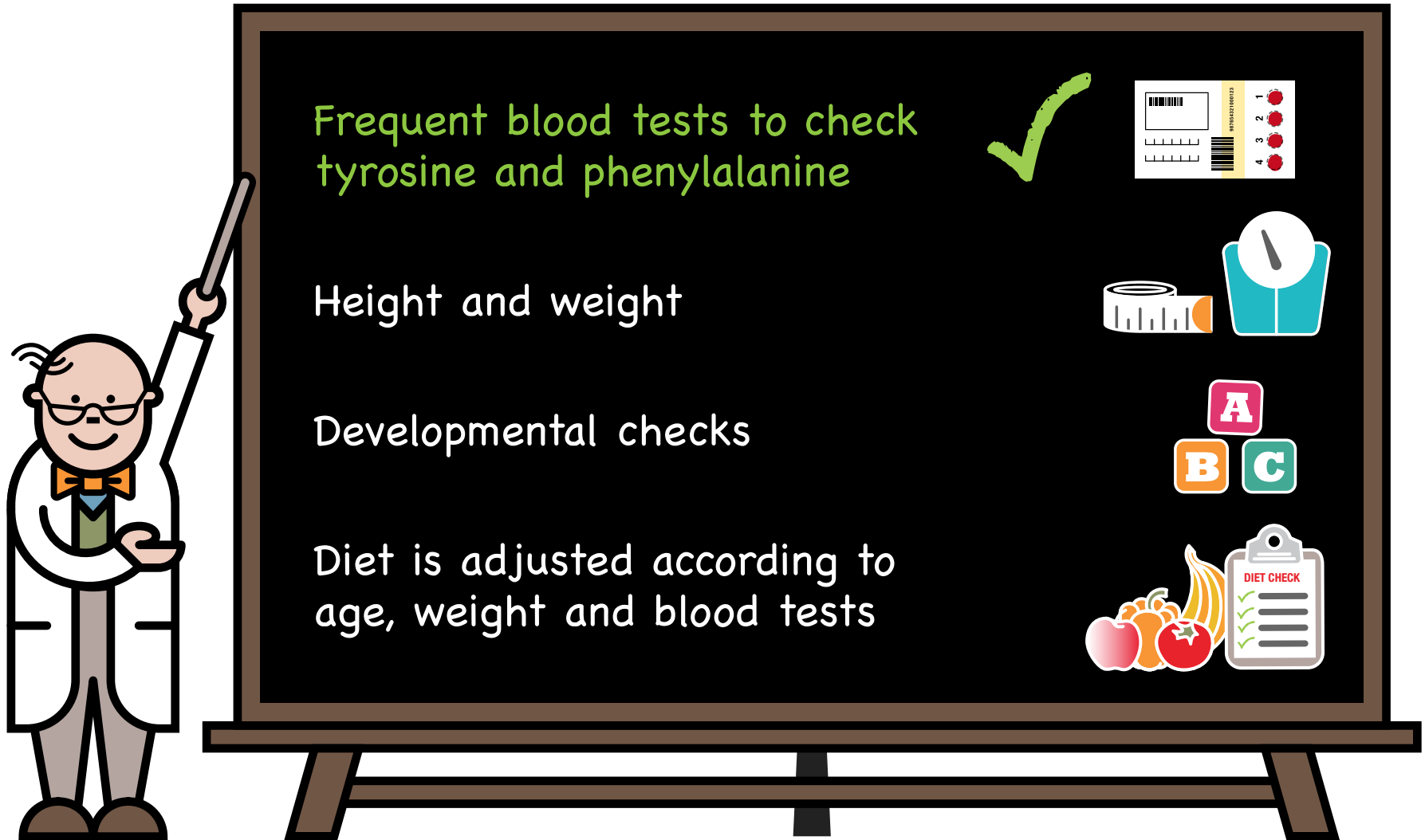
# How is TYR II managed during illness?

During any childhood illness, catabolism or protein breakdown occurs, causing blood tyrosine levels to increase.

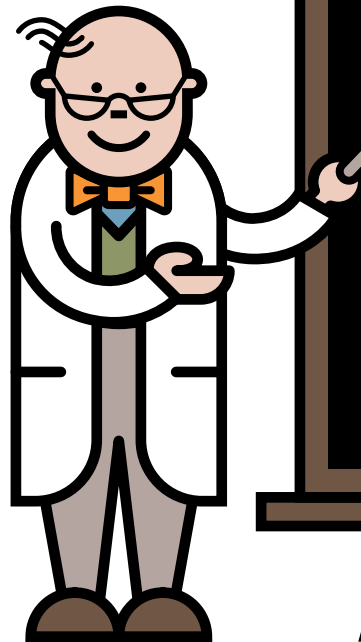
It is important to continue with the usual diet as much as possible.



# How is TYR II monitored?



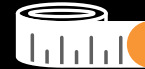
# How is TYR II monitored?



Frequent blood tests to check tyrosine and phenylalanine



Height and weight



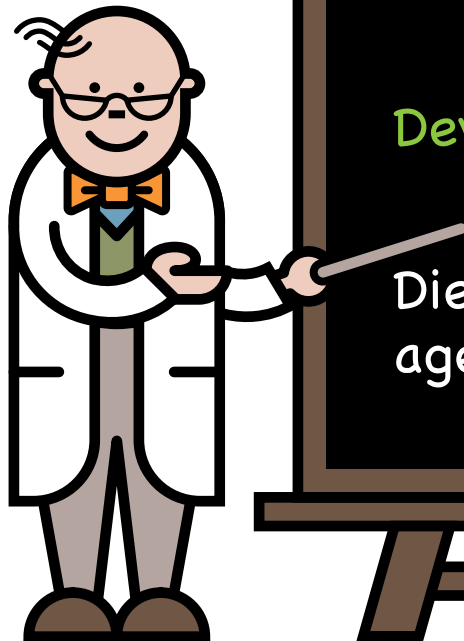
Developmental checks



Diet is adjusted according to age, weight and blood tests



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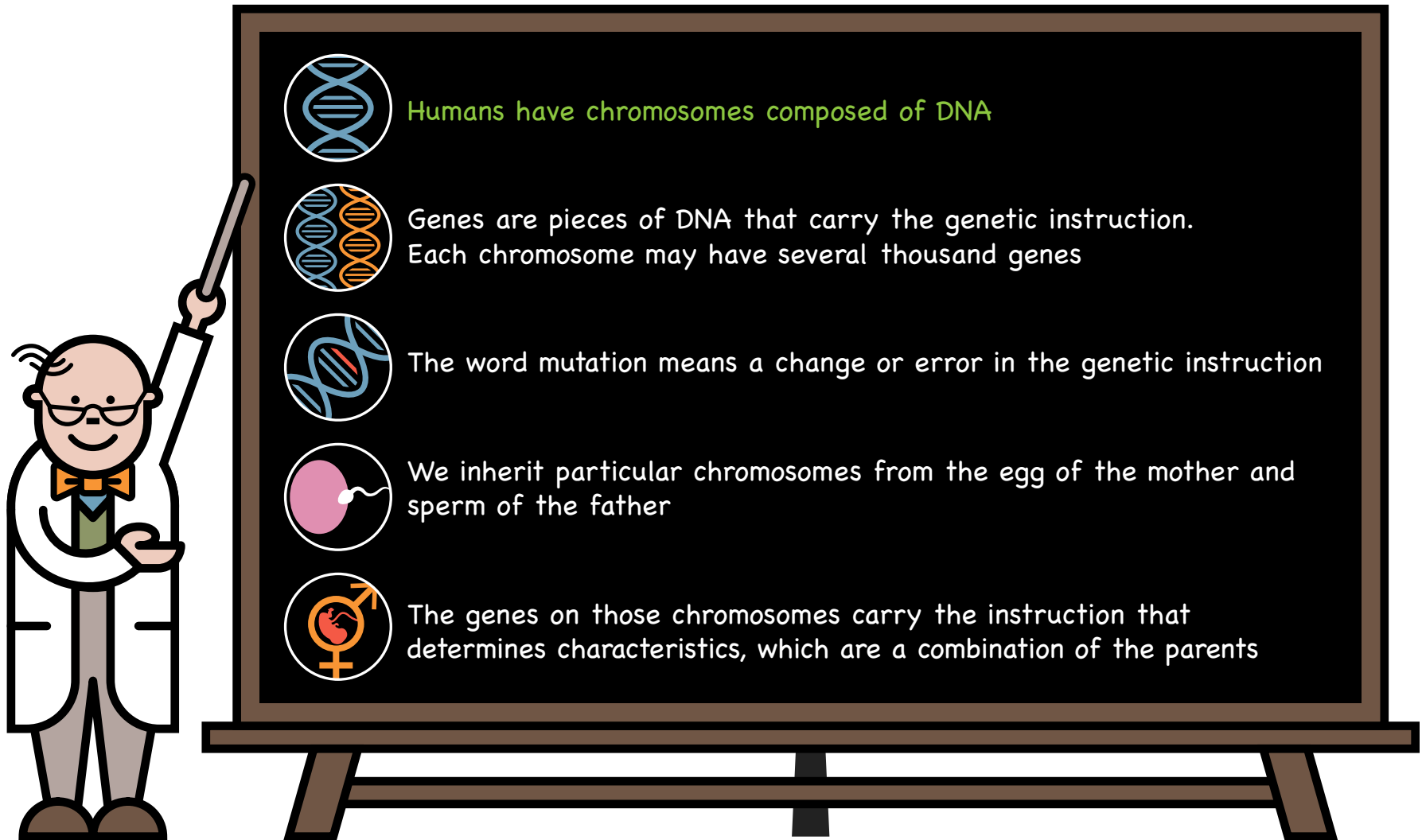
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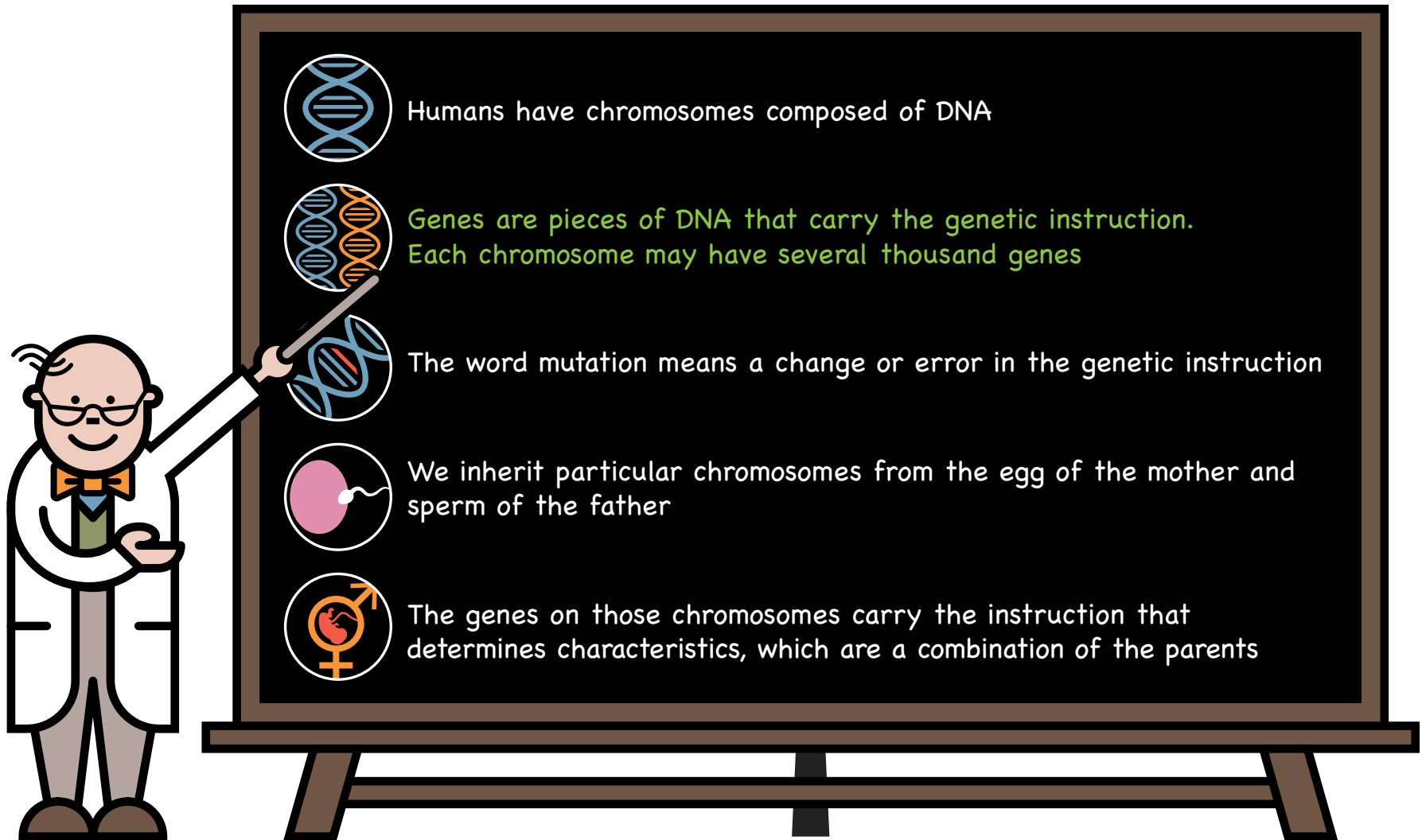
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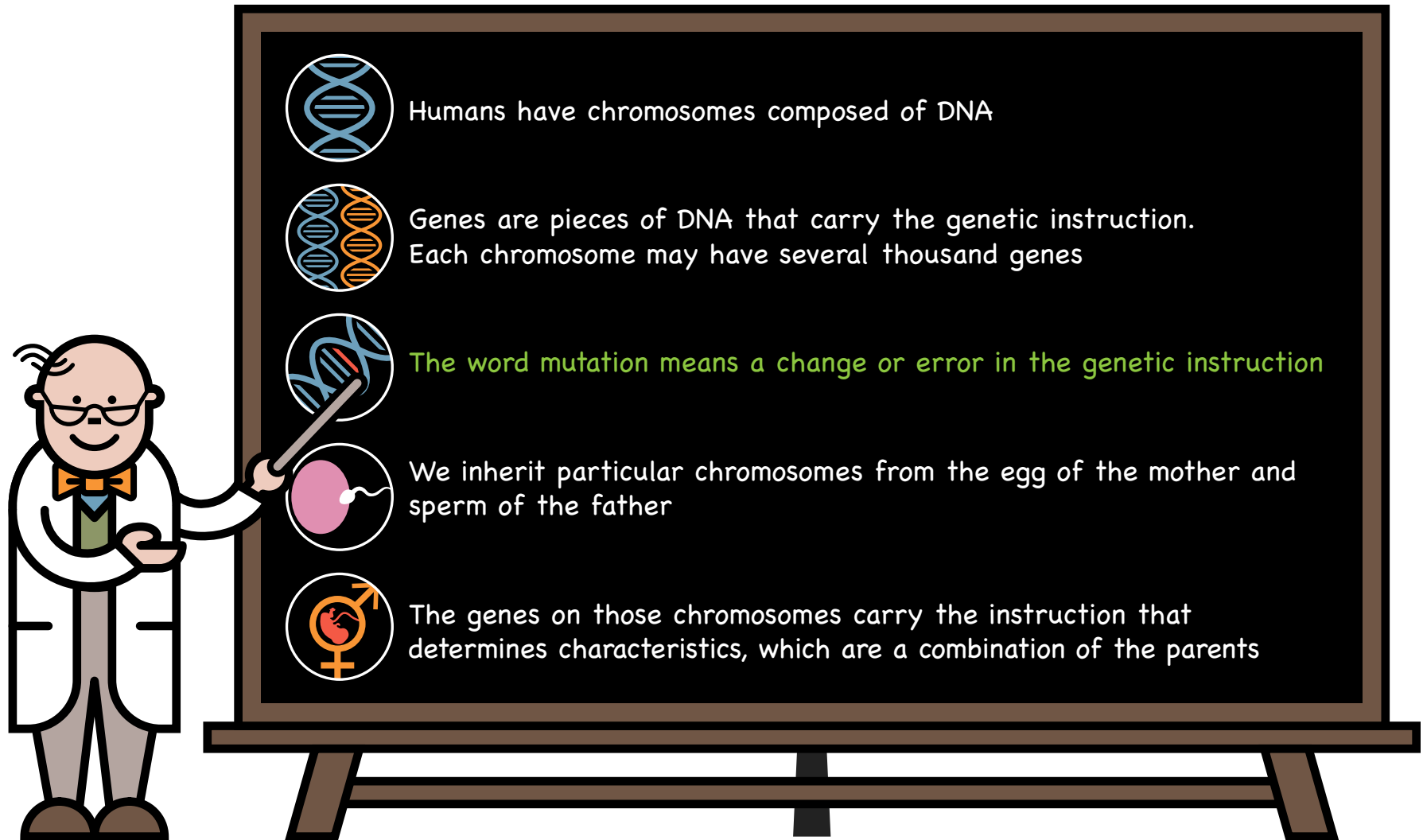
# Chromosomes, genes, mutations



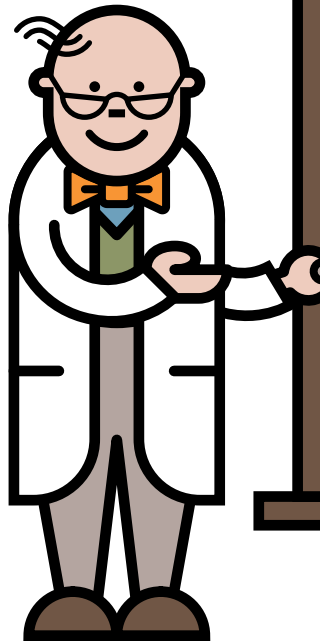
# Chromosomes, genes, mutations



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# Chromosomes, genes, mutations



Humans have chromosomes composed of DNA



Genes are pieces of DNA that carry the genetic instruction. Each chromosome may have several thousand genes



The word mutation means a change or error in the genetic instruction

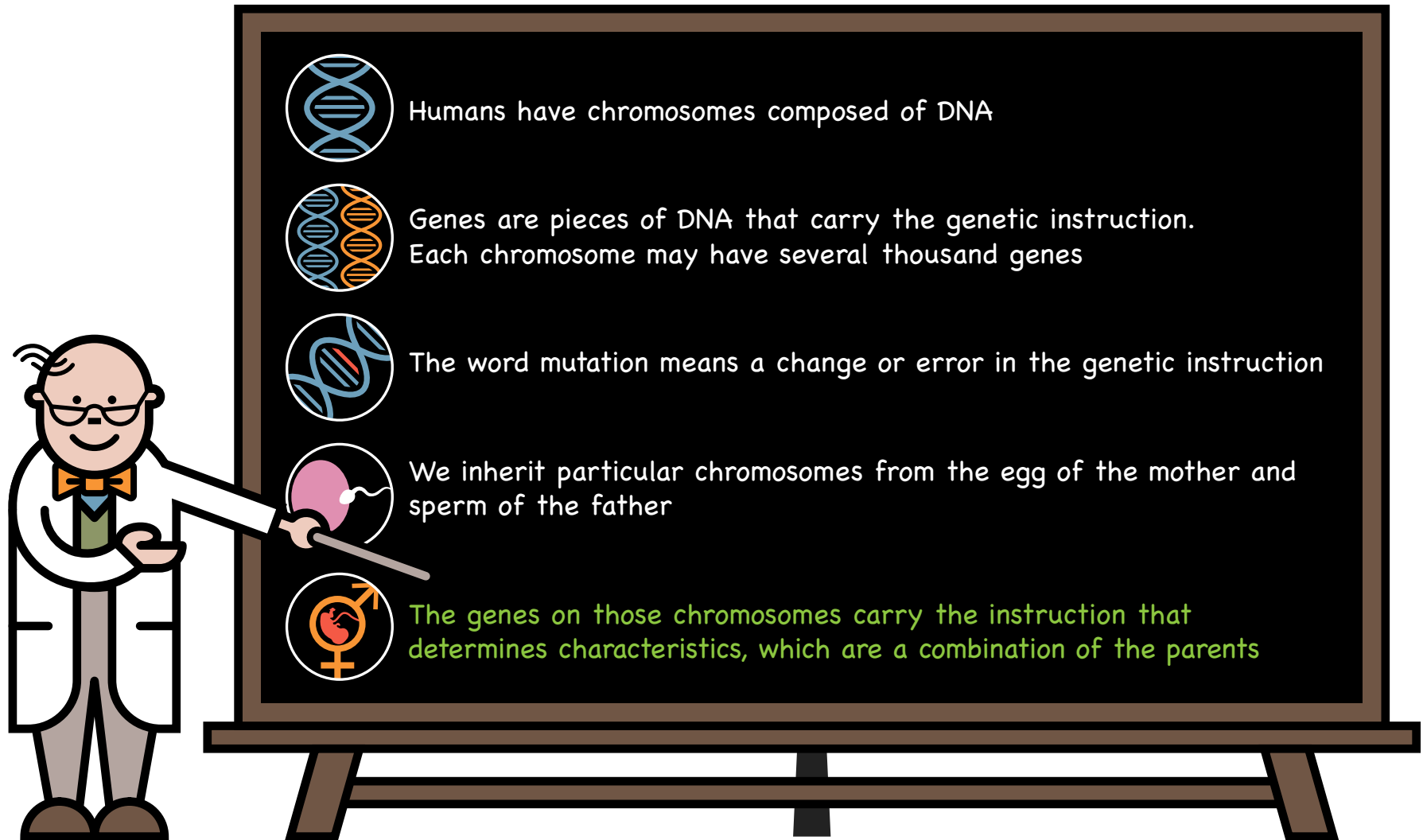


We inherit particular chromosomes from the egg of the mother and sperm of the father

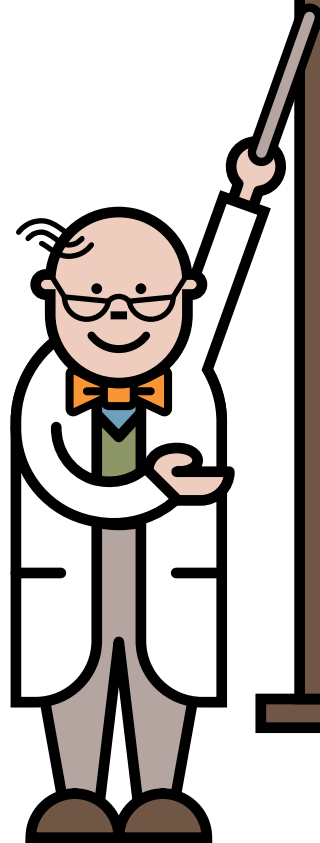


The genes on those chromosomes carry the instruction that determines characteristics, which are a combination of the parents

# Chromosomes, genes, mutations



# Inheritance



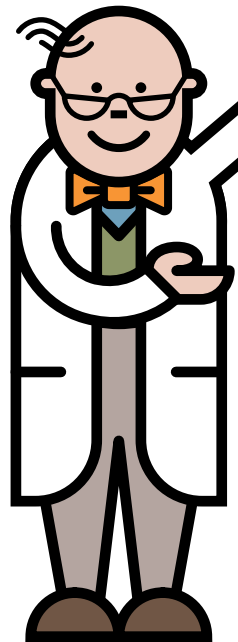
TYR II is an inherited condition. There is nothing that could have been done to prevent your baby from having TYR II

Everyone has a pair of genes that make the tyrosine aminotransferase enzyme. In children with TYR II, neither of these genes works correctly. These children inherit one non-working TYR II gene from each parent

Parents of children with TYR II are carriers of the condition

Carriers do not have TYR II because the other gene of this pair is working correctly

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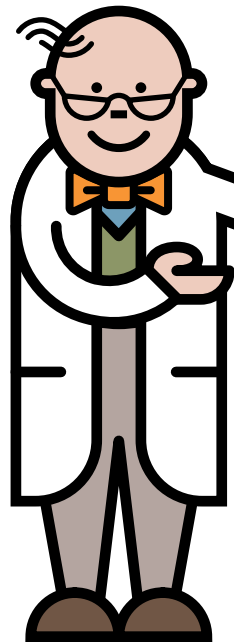
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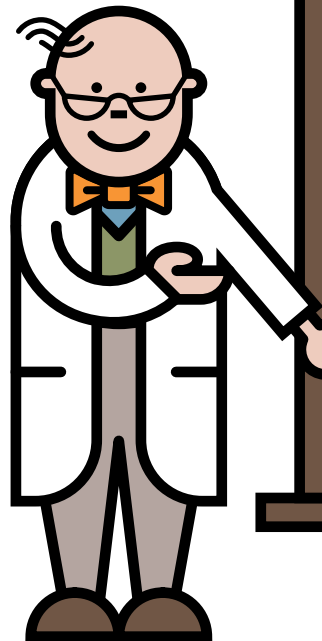
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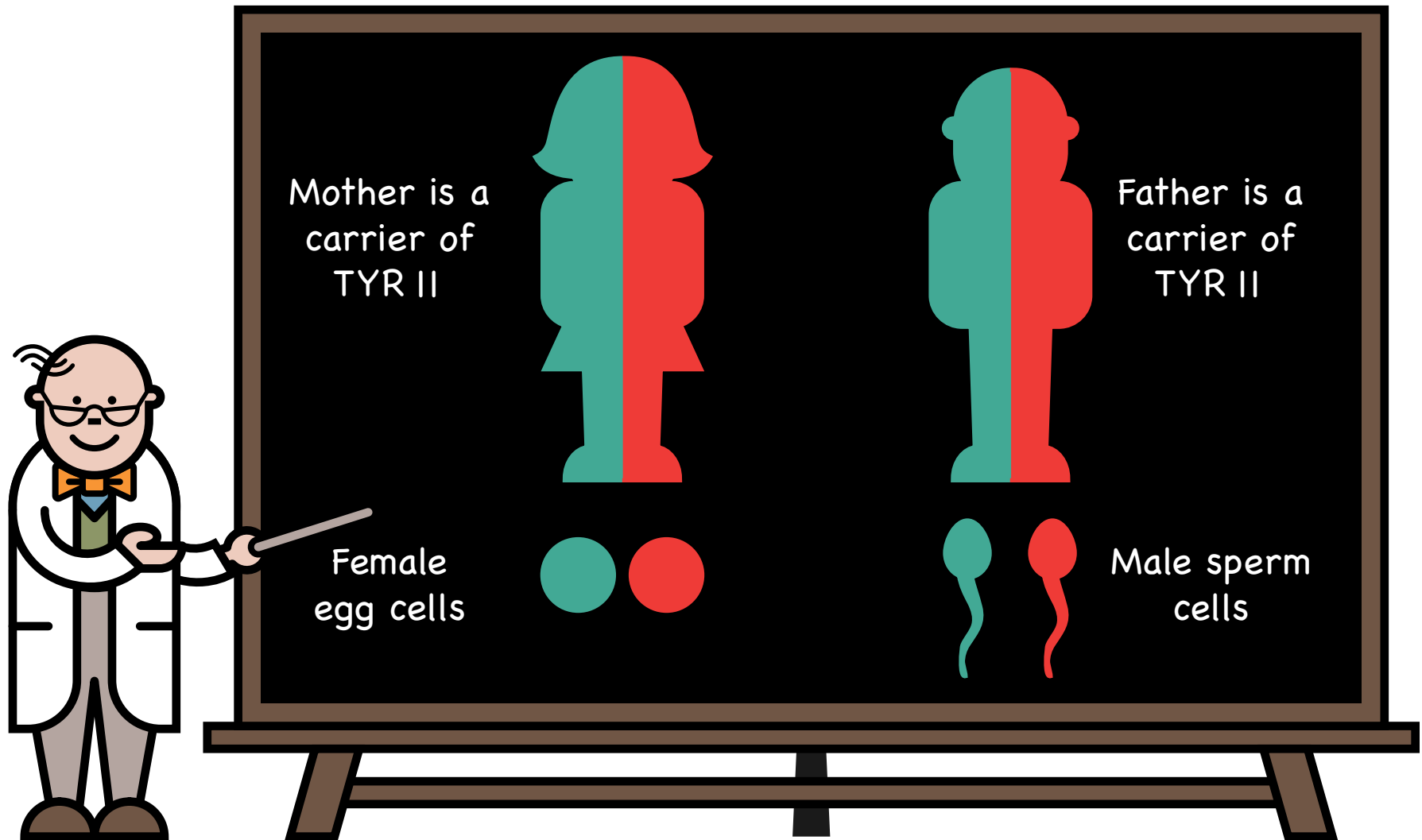


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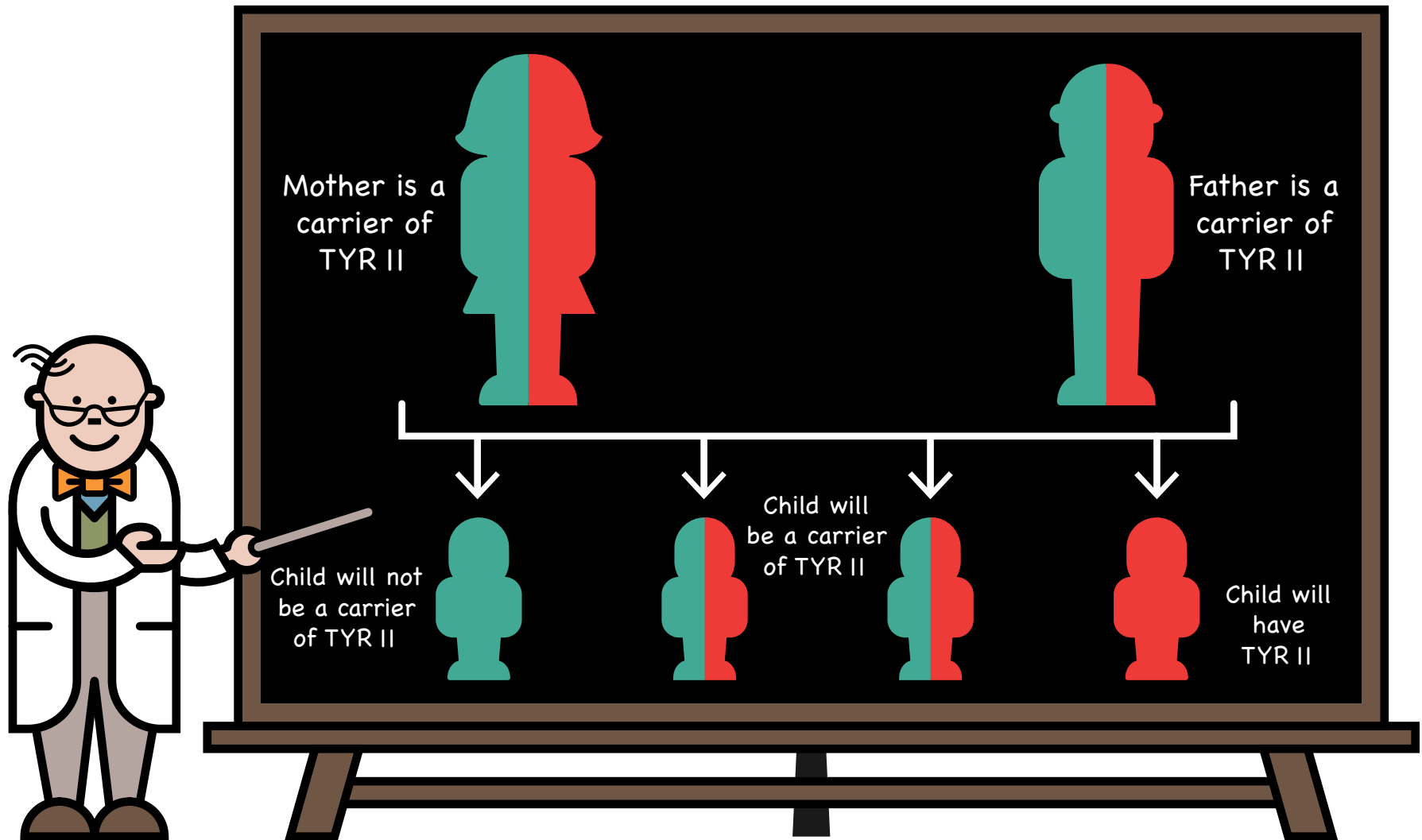


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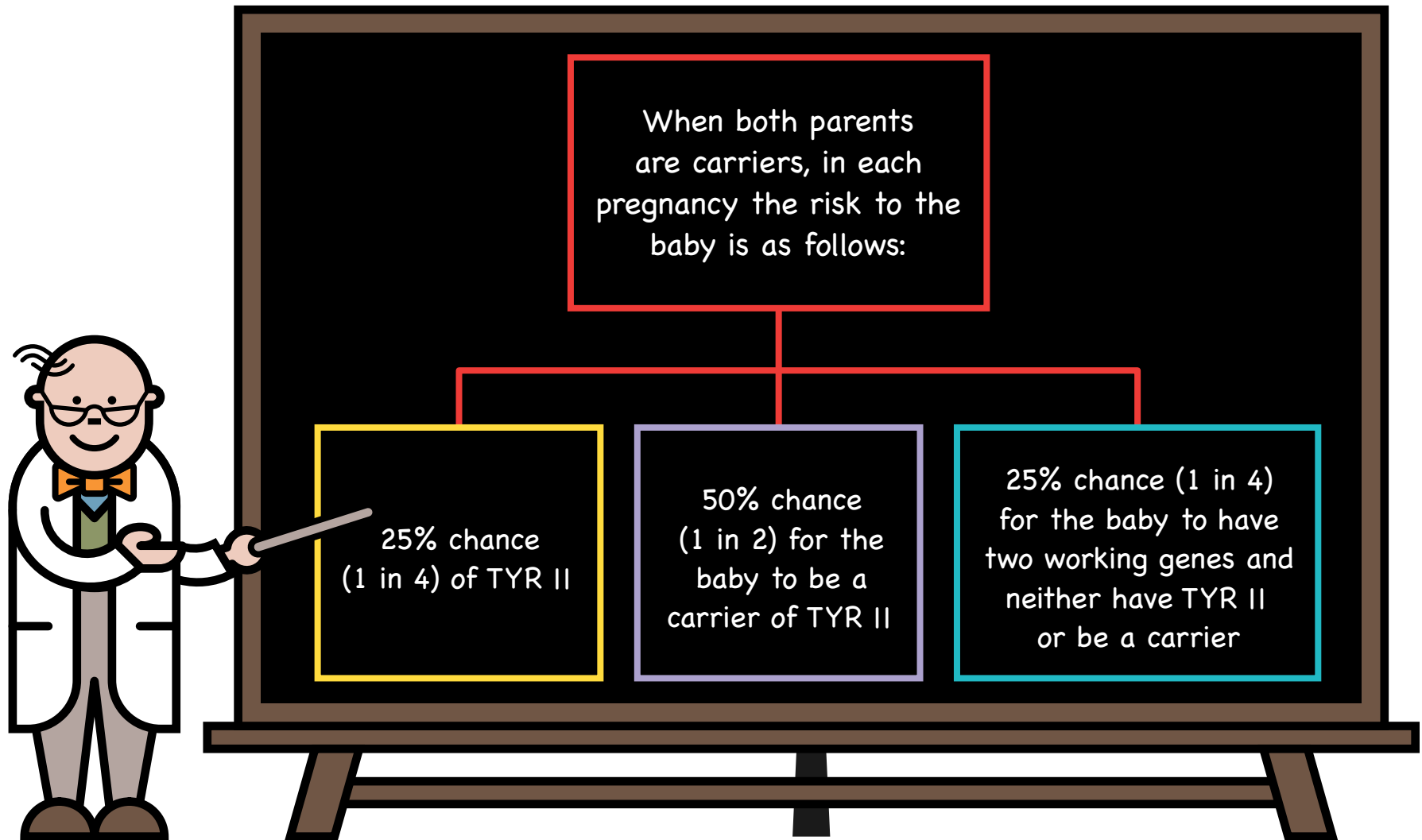
# Inheritance – Autosomal recessive (carriers of TYR II)



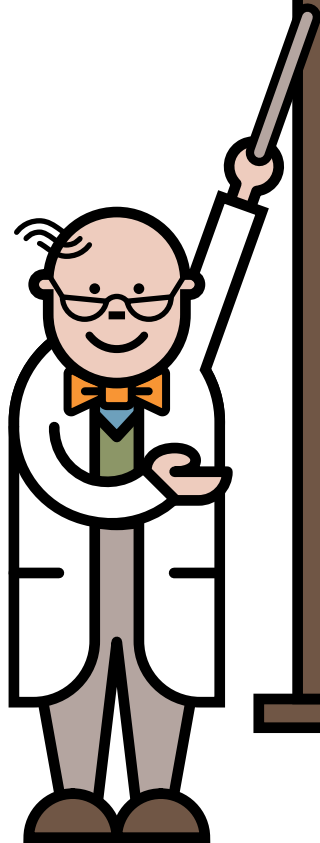
# Inheritance – Autosomal recessive – possible combinations



# Future pregnancies



# Take home messages

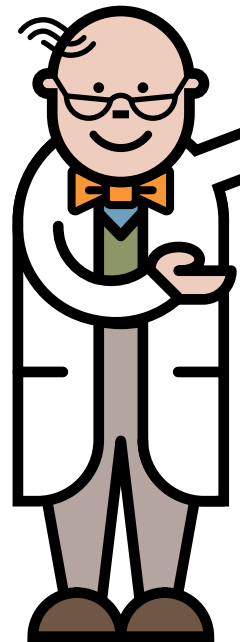


TYR II is a serious inherited metabolic disorder that can lead to eye and skin problems and affect intellectual ability

Damage can be prevented with a diet low in tyrosine and a protein substitute

Remember to give the correct amount of protein exchanges and protein substitute as prescribed by your metabolic centre

# Take home messages



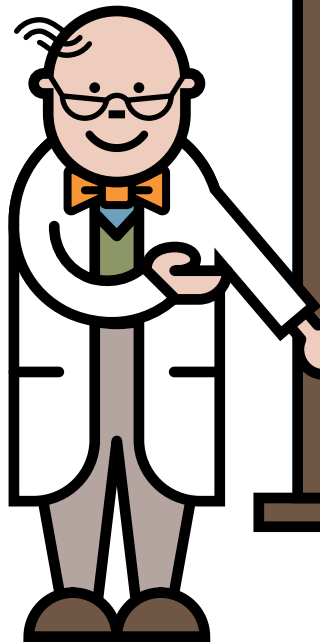
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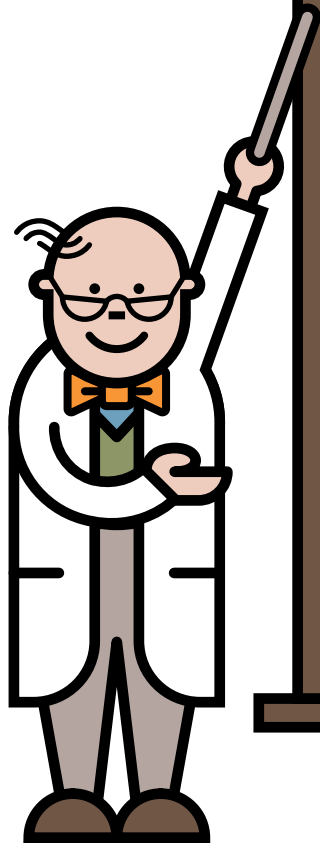
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# Helpful hints



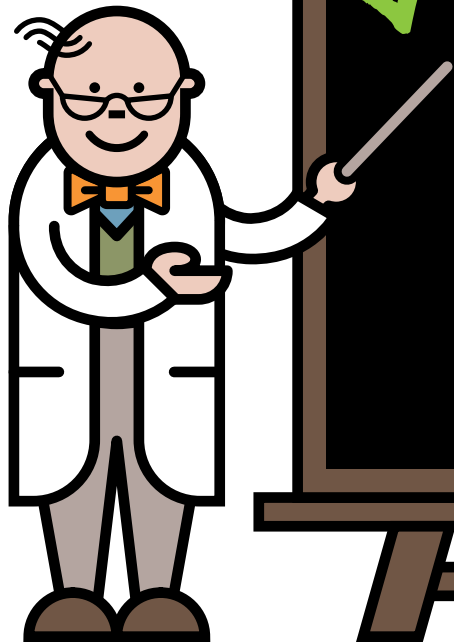
Always ensure you have a good supply of your dietary products and protein substitutes and that they are in date

Your dietary products and protein substitute are prescribed by your GP. These are obtained via a pharmacy or home delivery

Always ensure you have sufficient blood testing equipment and send samples on a regular basis

Medications to control fever should be given as normally recommended – always keep supplies available

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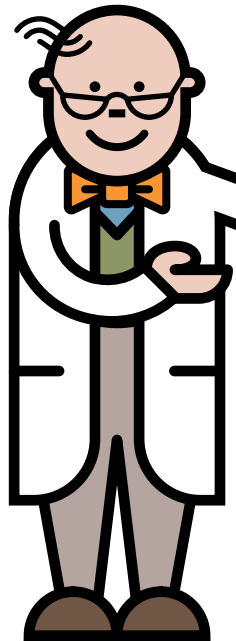


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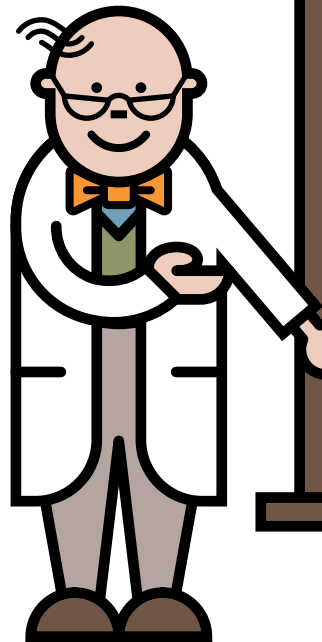
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# Who's who

- My dietitians
- My nurses
- My doctors
  - Contact details, address, photos

Visit [www.nutricia.co.uk/patients-carers/living-with/low-protein-diet.html](http://www.nutricia.co.uk/patients-carers/living-with/low-protein-diet.html) and register to get access to support and practical advice for those living on a low protein diet.

The site also provides information on upcoming events and personal stories from others on a low protein diet.



@LowProConnect



LowProConnect



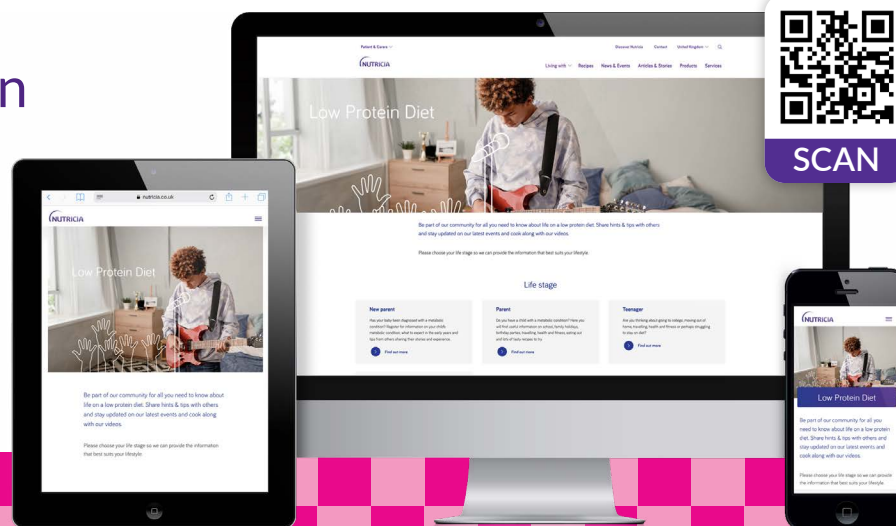
LowProteinConnect



LowProteinConnect



SCAN



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