Diagnosing Cystic Fibrosis

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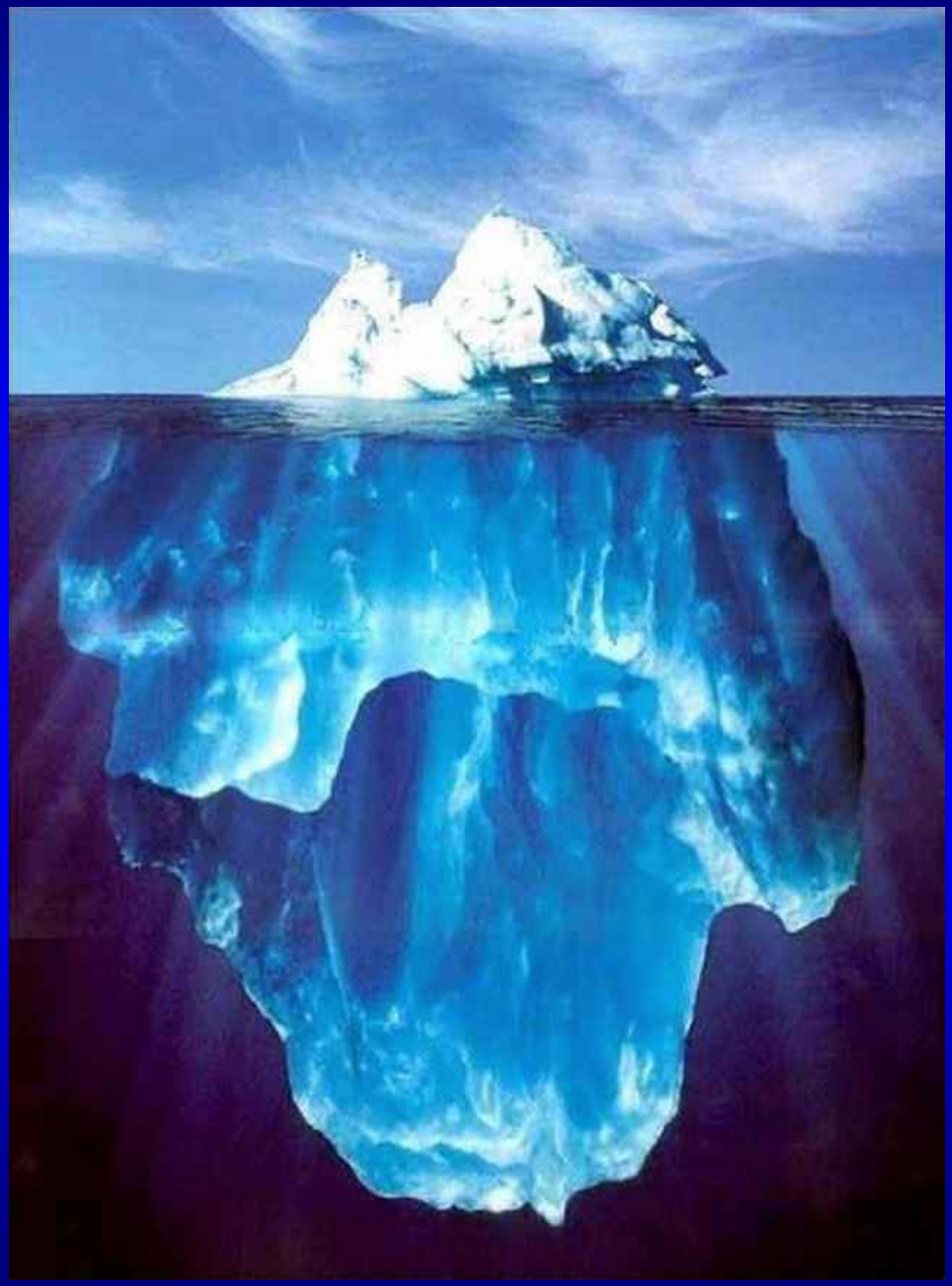
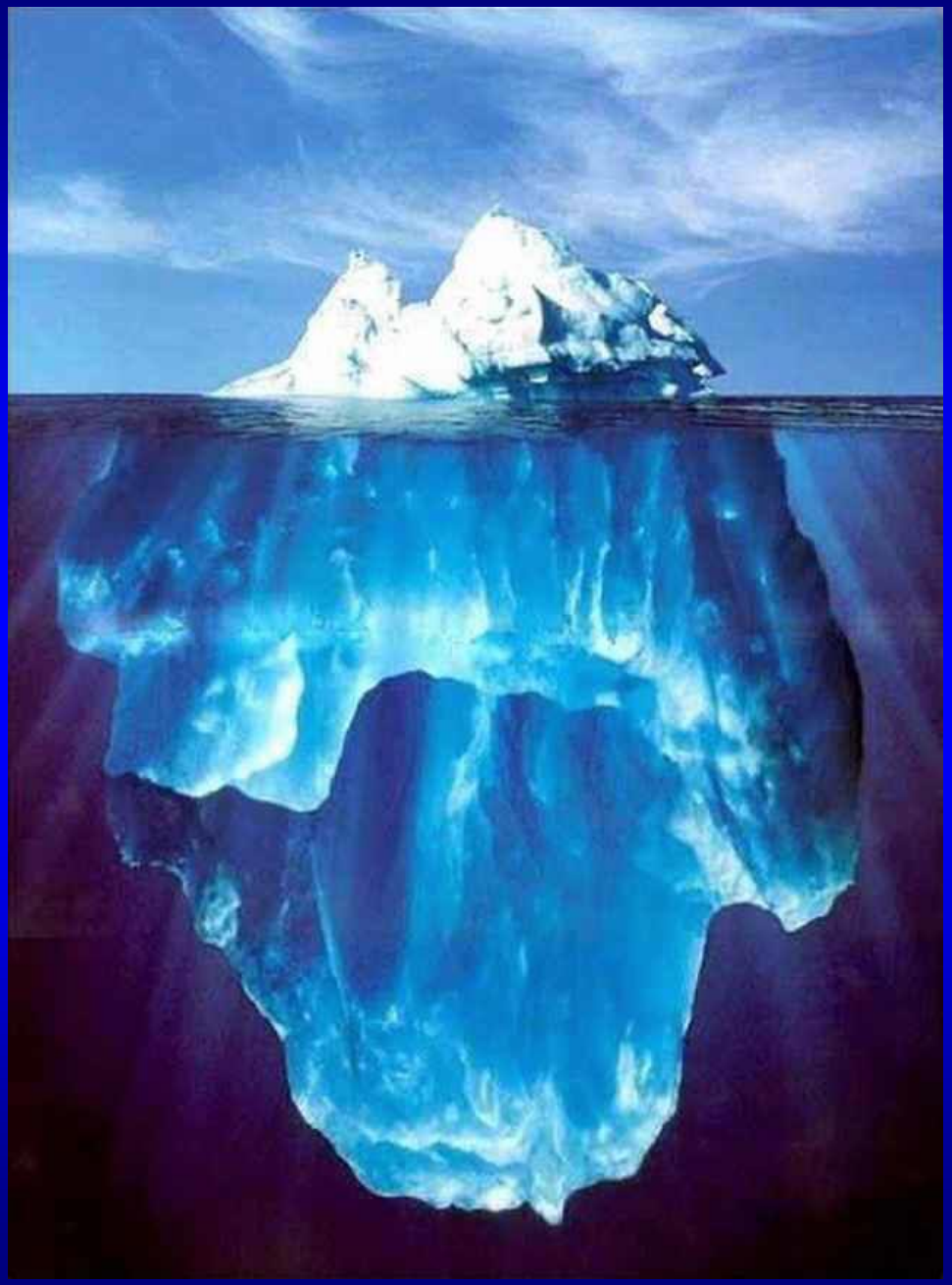




Diagnosed CF

Undiagnosed CF

Cystic Fibrosis

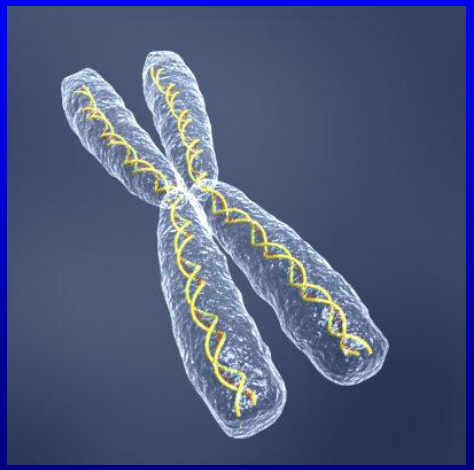
- What is CF
- CF in Latvia
- When to suspect CF
- How is CF diagnosed

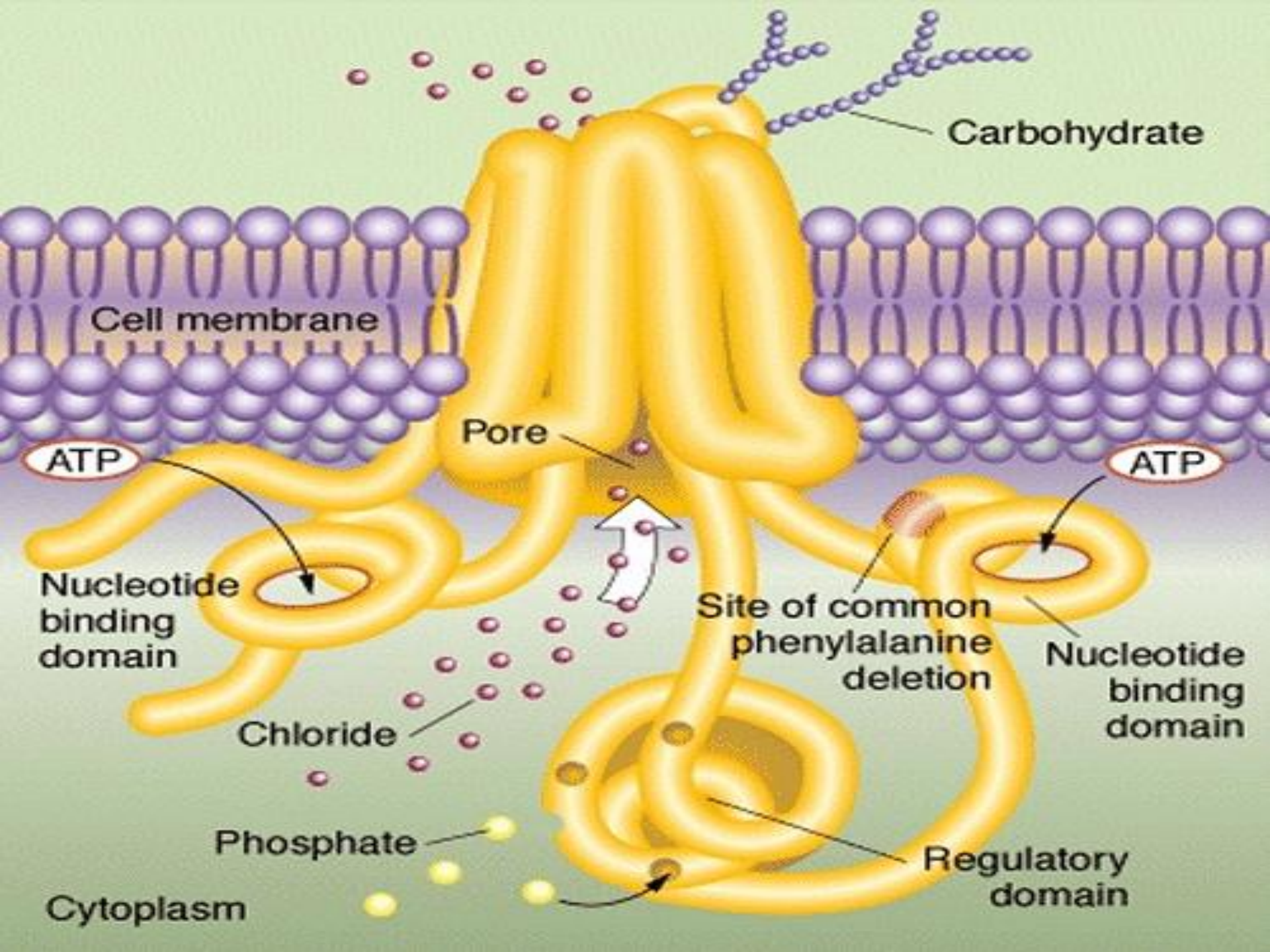
What is Cystic Fibrosis

- A genetic disorder
- The ***most common*** life limiting inherited disease among most caucasian populations

What is Cystic Fibrosis

The gene that goes wrong is called CFTR and controls the movement of salt and water across cell surfaces

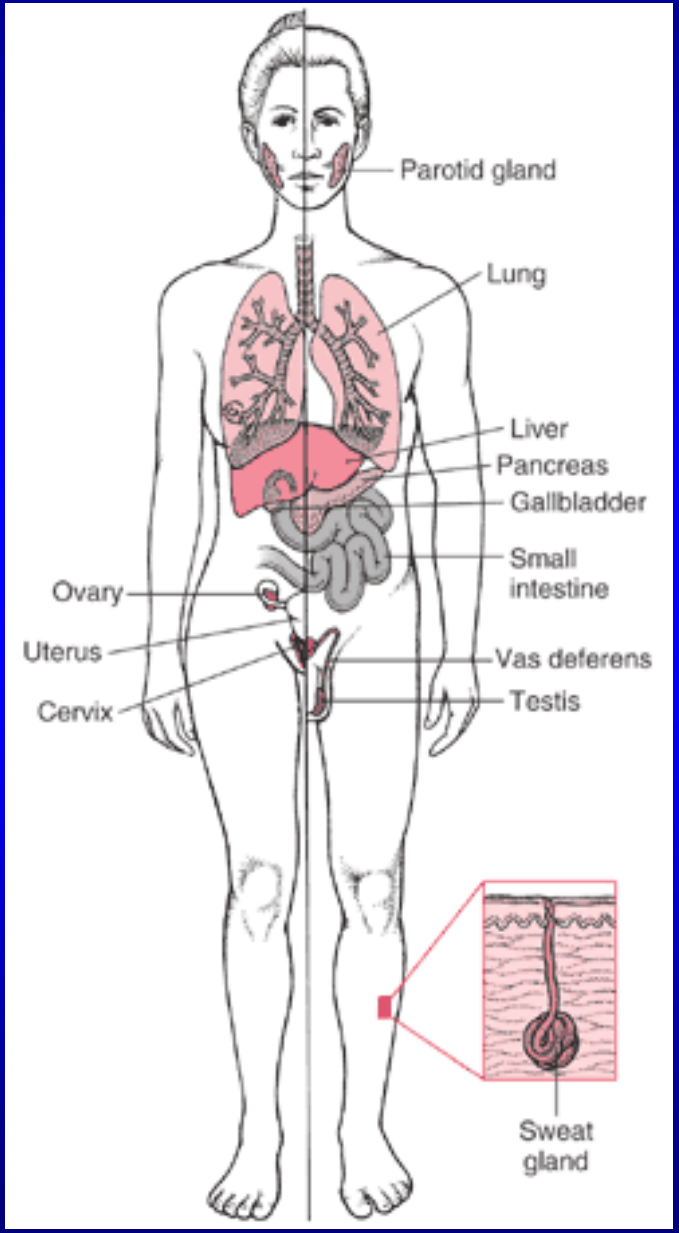


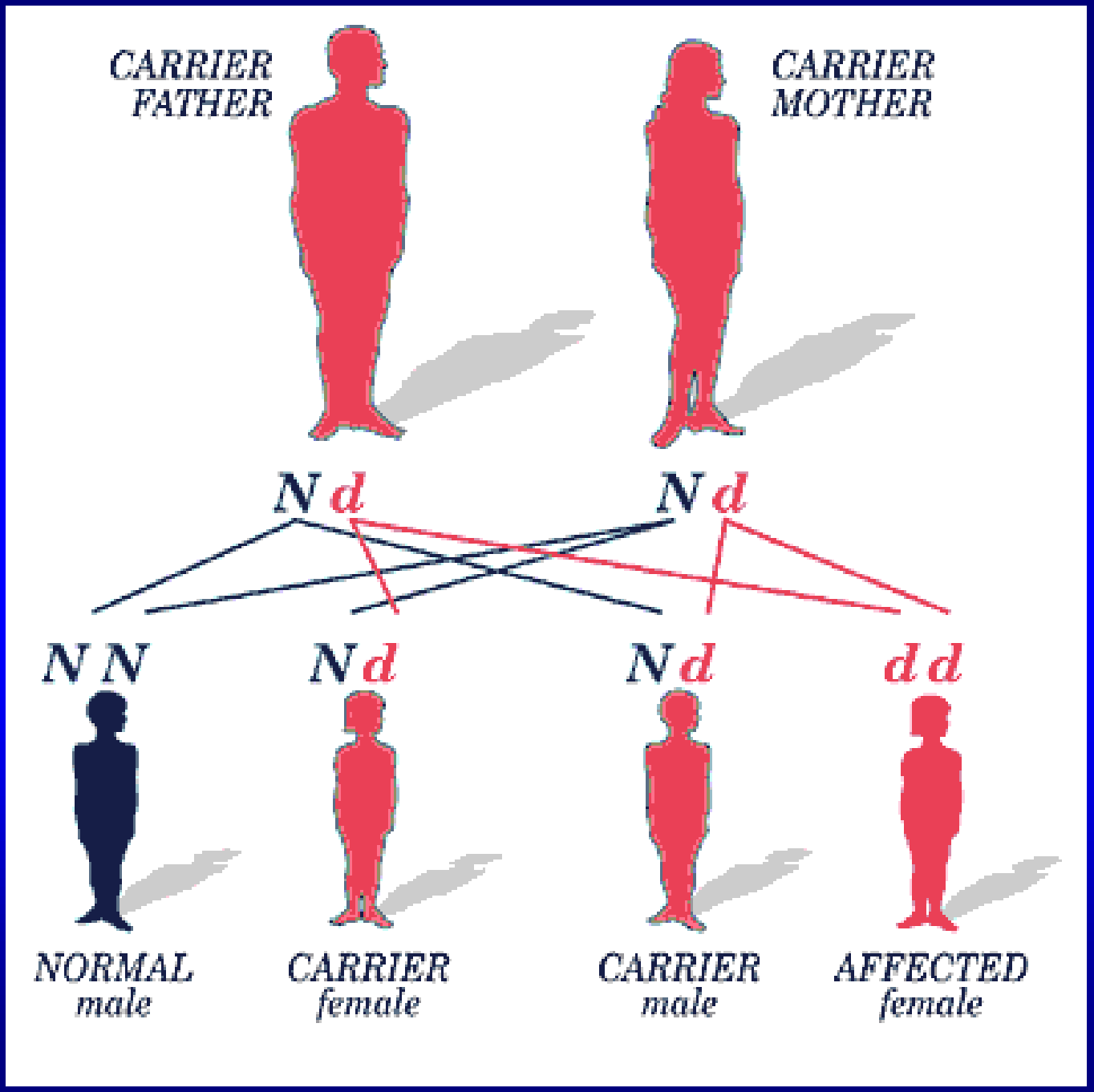

Carbohydrate
Cell membrane
Pore
ATP
ATP
Nucleotide binding domain
Site of common phenylalanine deletion
Nucleotide binding domain
Chloride
Phosphate
Regulatory domain
Cytoplasm

What is Cystic Fibrosis

This protein is found in..

- sweat glands
- the pancreas
- the gut
- lungs
- many other tissues




CARRIER
FATHER
CARRIER
MOTHER
N d
N d
N N
N d
N d
d d
NORMAL
male
CARRIER
female
CARRIER
male
AFFECTED
female

How Common is CF in Latvia?

Neonatal Cystic Fibrosis Screening in Latvia: a pilot project

Baiba Lace et al Riga Stradins University,
Dept of Medical Biology and Genetics

Neonatal Cystic Fibrosis Screening in Latvia: a pilot project

- Estimated frequency of CF 1:3250
- First infant in Latvia identified through new born screening

Baiba Lace et al Riga Stradins University, Dept of Medical Biology and Genetics

Numbers

UK

- 1 person in 25 carries the CF gene
- 7500 people have CF
- Every week five babies are born with CF

Latvia

- 1 in 28 carry the defective gene for CF
- If survival figures were the same in Latvia as the UK there would be 170-200 patients
- There should be 6-8 new cases of CF every year in Latvia

Existing CF Service

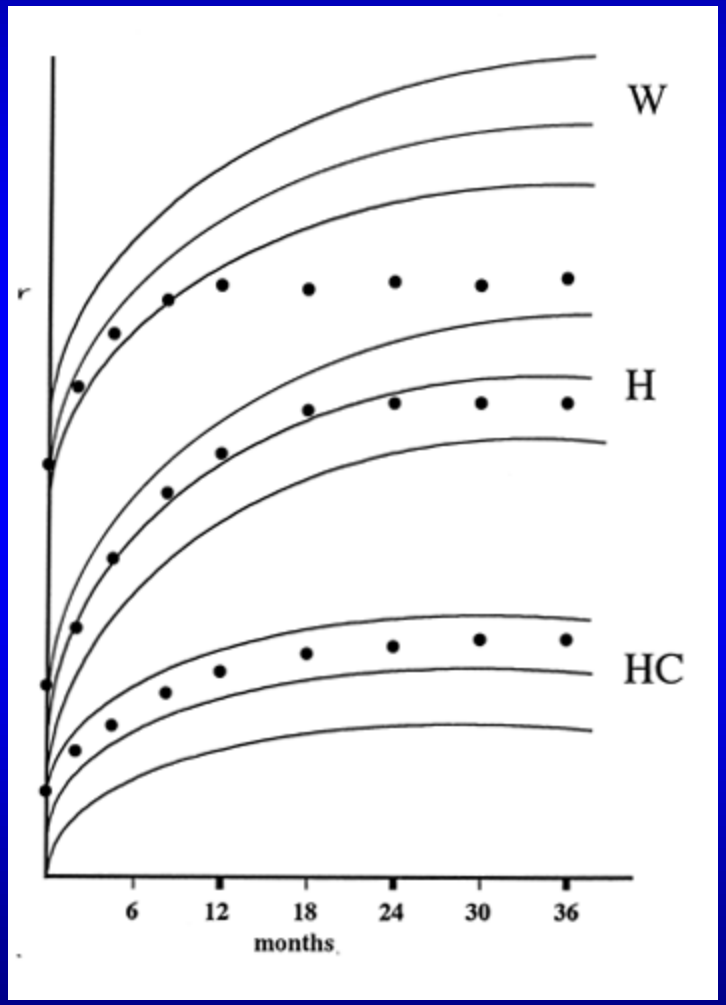
- 30 children should be attending CF services

Why is CF under recognised

- The diagnosis is challenging
- Symptoms can be misleading and readily explained by other causes

However the most common presenting feature is….

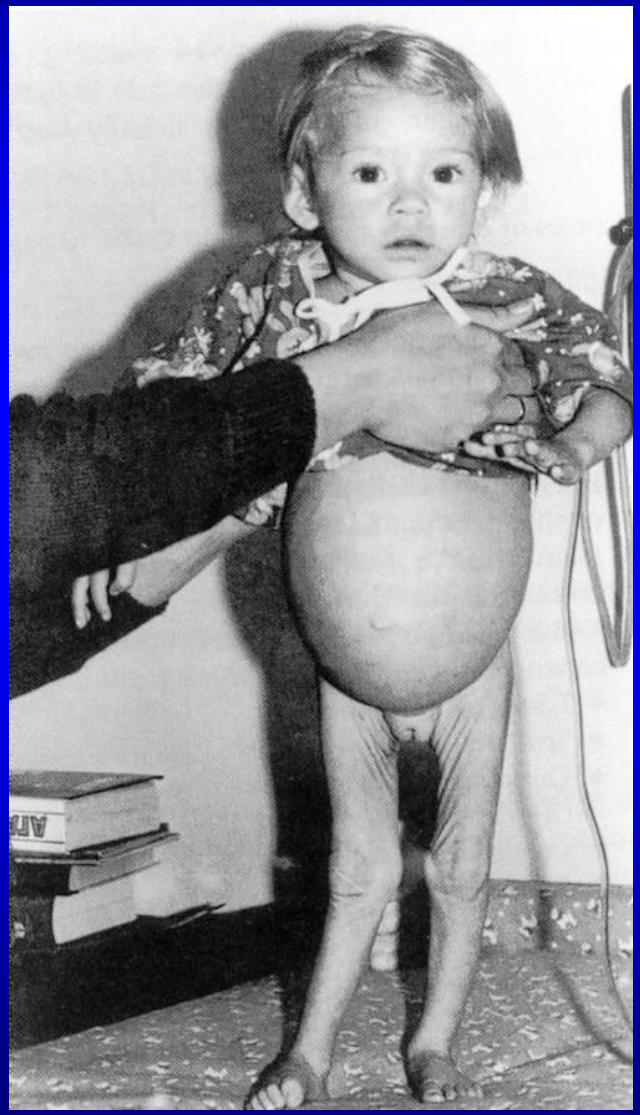
Failure to Thrive



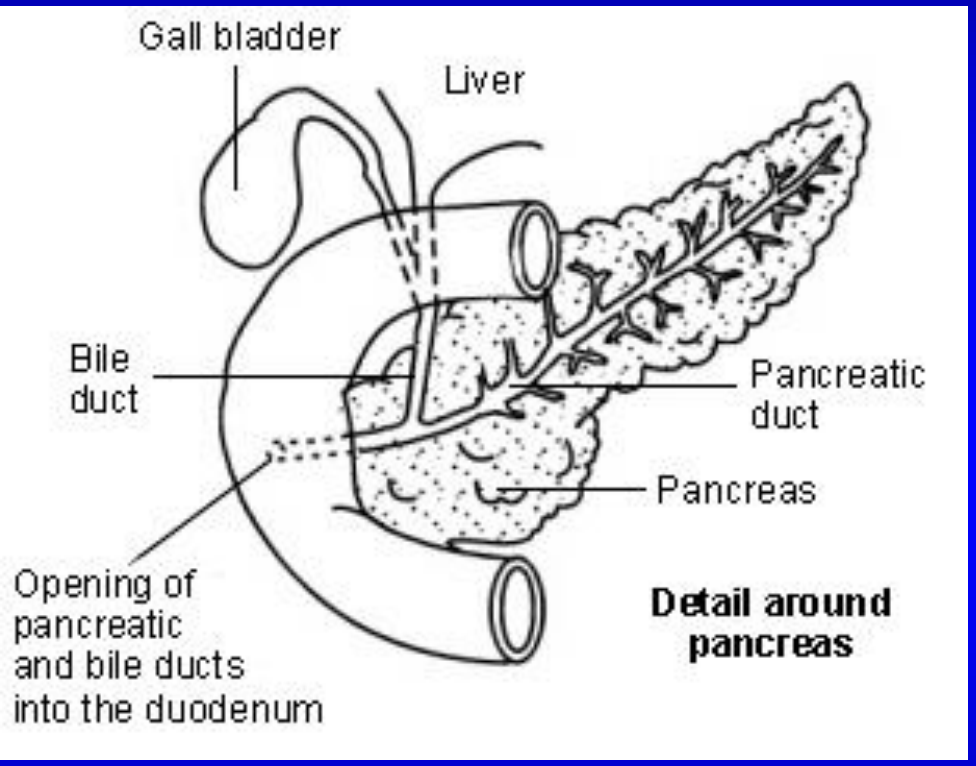
Causes of Failure to Thrive

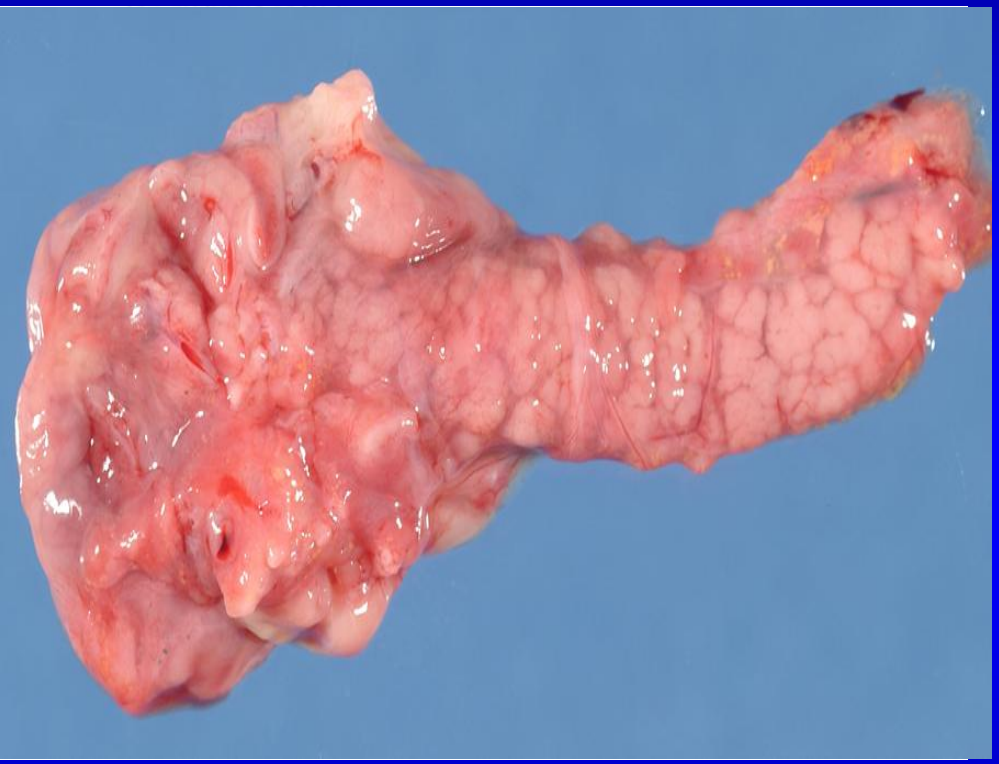
- Defective intake
  - insufficient breast milk,
  - wrongly prepared feeds or other feeding problems
- Excessive losses
  - diarrhoea and vomiting
- Organic Diseases
  - the baby using up more calories than they are able to consume

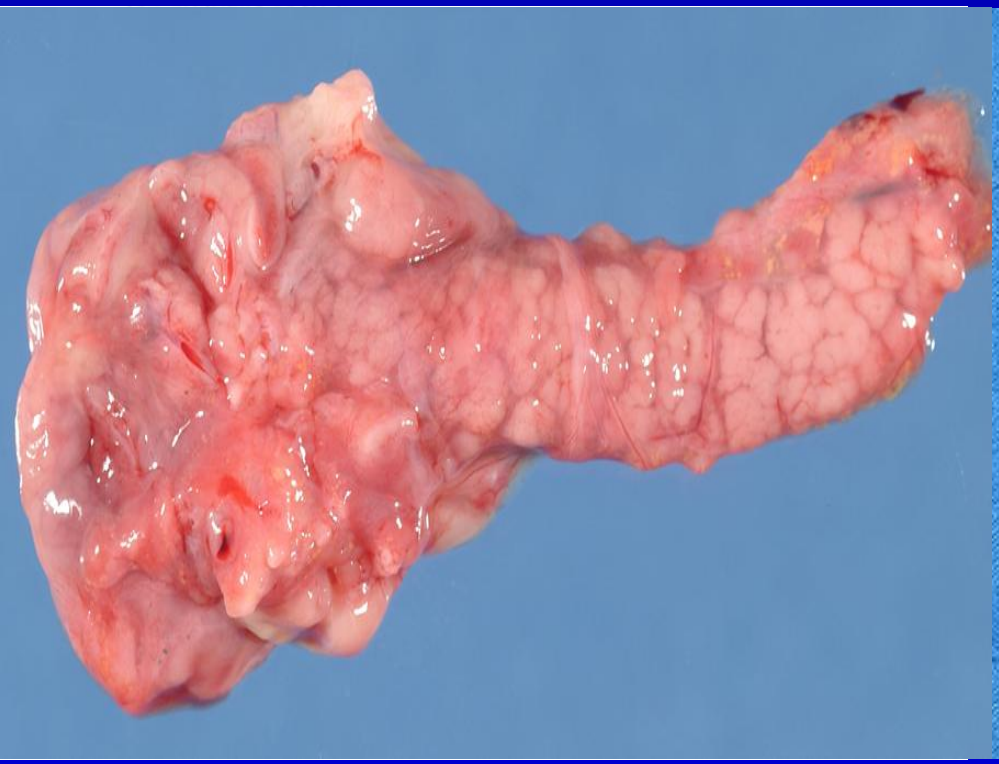
Cystic Fibrosis - ? An overlooked Cause of Failure to Thrive

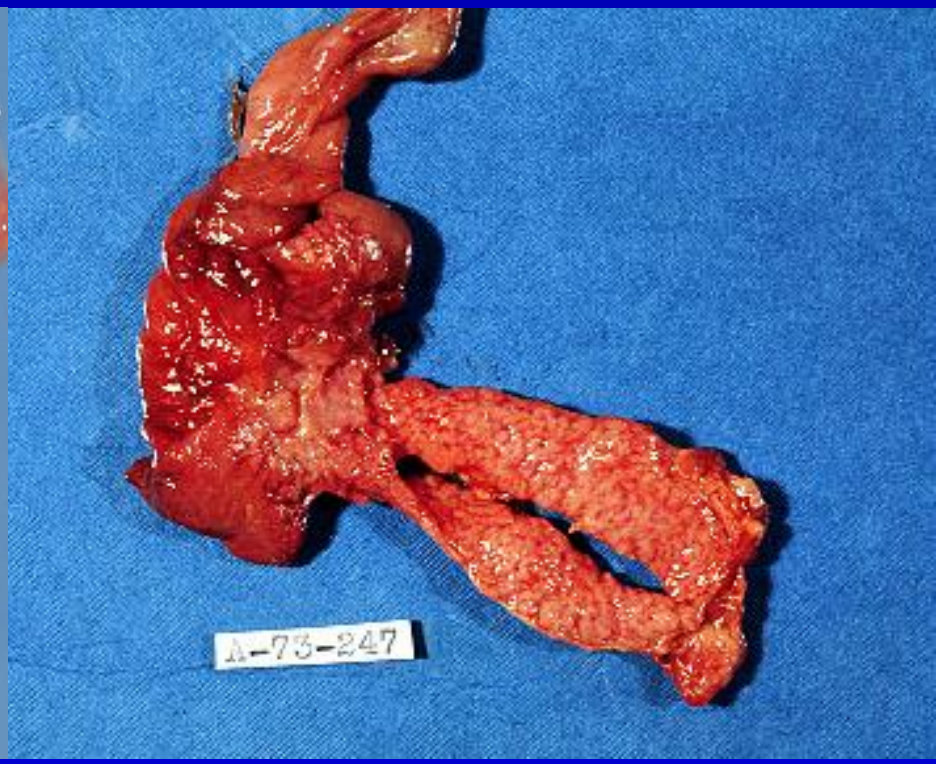


Why do patients with Cystic Fibrosis fail to thrive?


Gall bladder
Liver
Bile duct
Pancreatic duct
Pancreas
Opening of pancreatic and bile ducts into the duodenum
Detail around pancreas



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Infant presentation – not straightforward

Infant presentation – not straightforward

- Babies sometimes thrive on breast milk because of breast lipases
- Babies often eat large amounts to compensate for malabsorption
- When infections happen and feeding falls off weight loss can then be dramatic

Three Questions for detecting Cystic Fibrosis

Question 1

Does your child taste salty when kissed?

Beware the salty child
for they will surely die!!!

Children with CF have Salty Sweat

- Abnormal sweat gland function results in very salty sweat and tears
- Look for the salt crystals on the face if the child has been crying.

Question 2

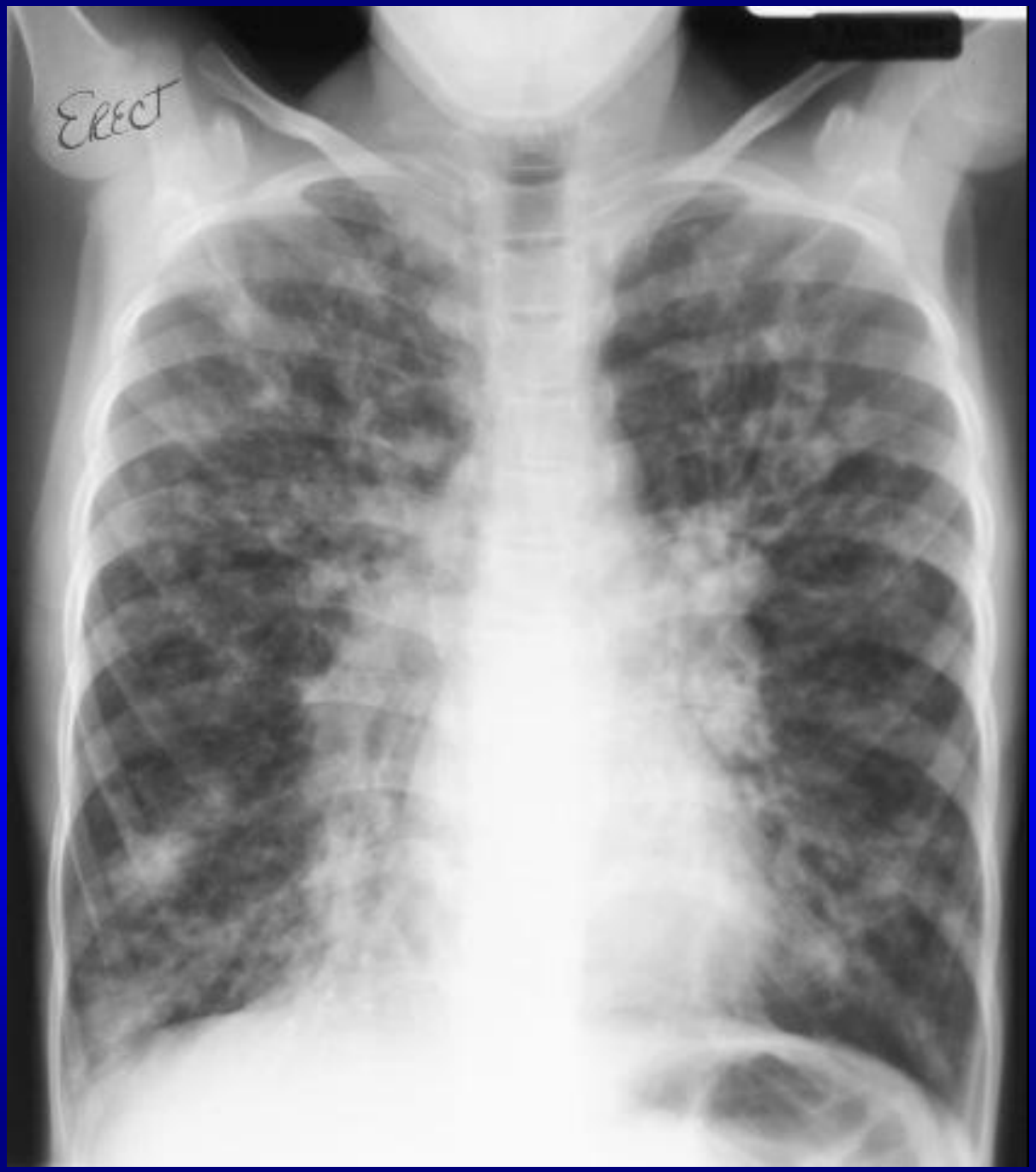
How often does your baby poo and what is it like?

Symptoms of Fat Malabsorption

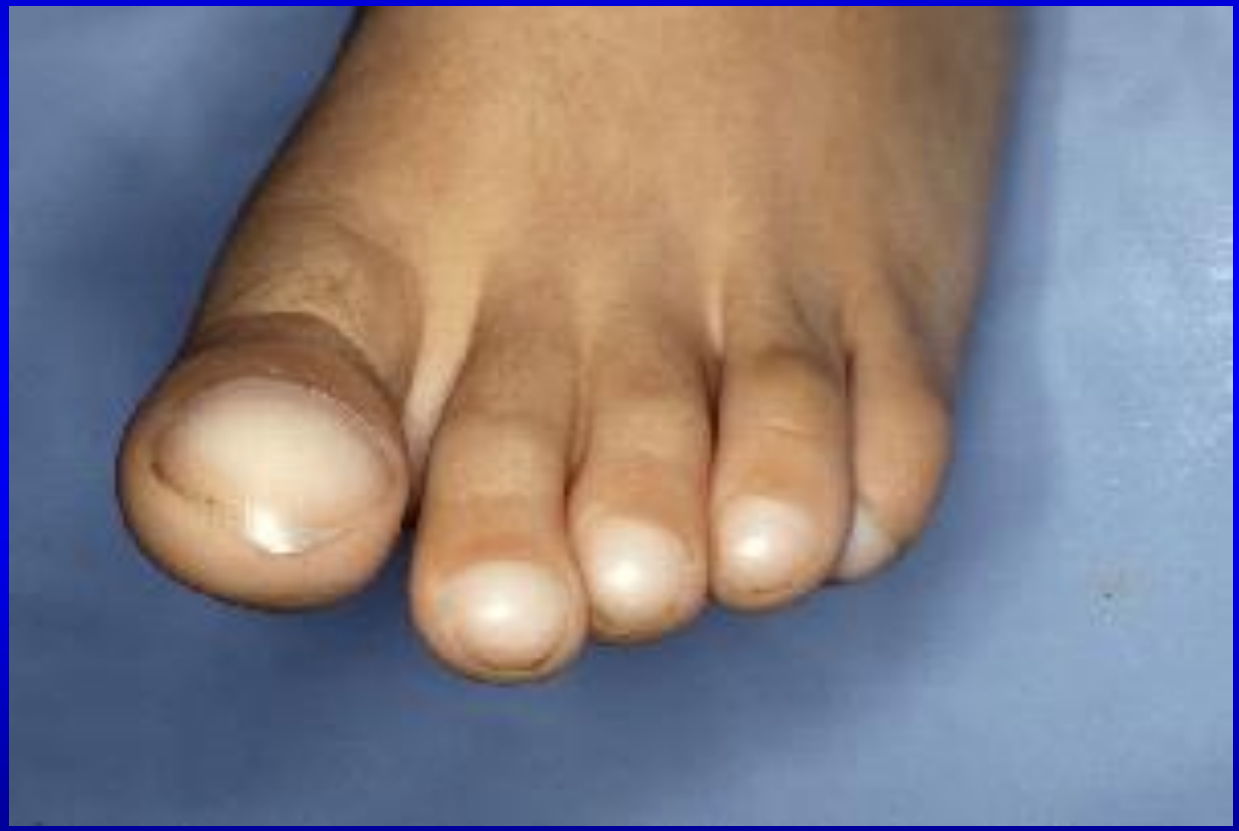
- Frequent, loose, fatty stools
- Difficult to flush
- Oil in toilet
- Orange / pale in colour
- Rancid offensive smell

Question 3

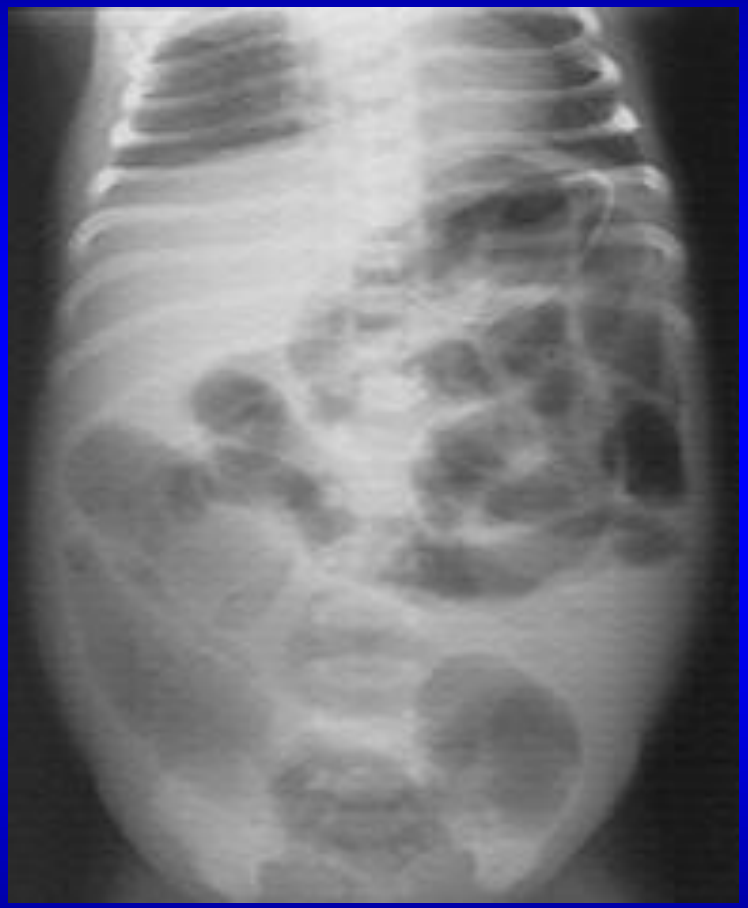
Does your baby have a persistent wet cough?


ERECT

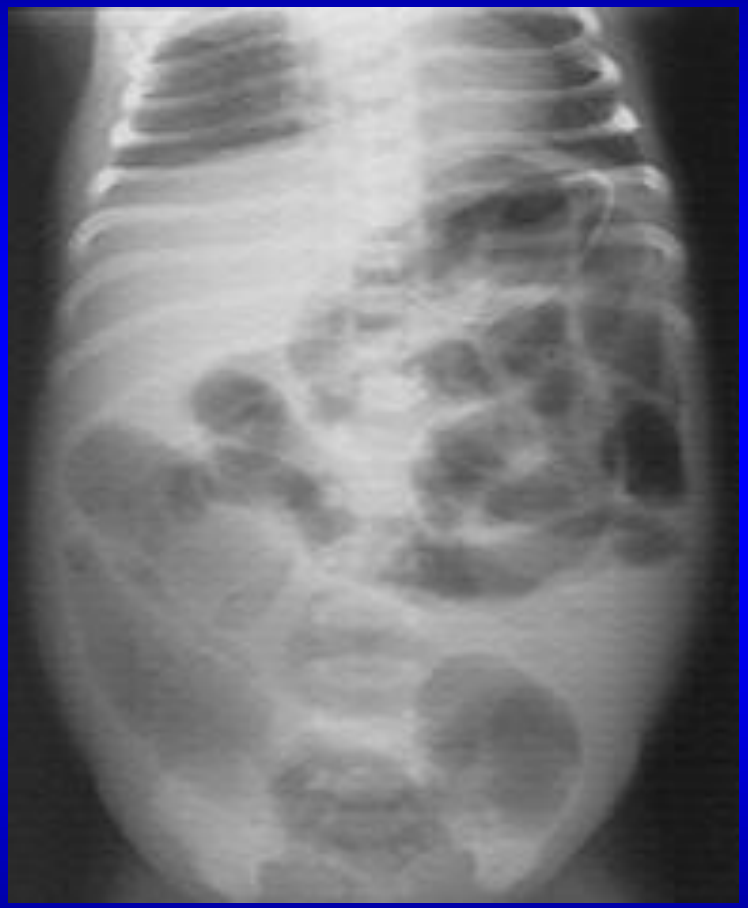
Clubbing



Other rarer presentations…

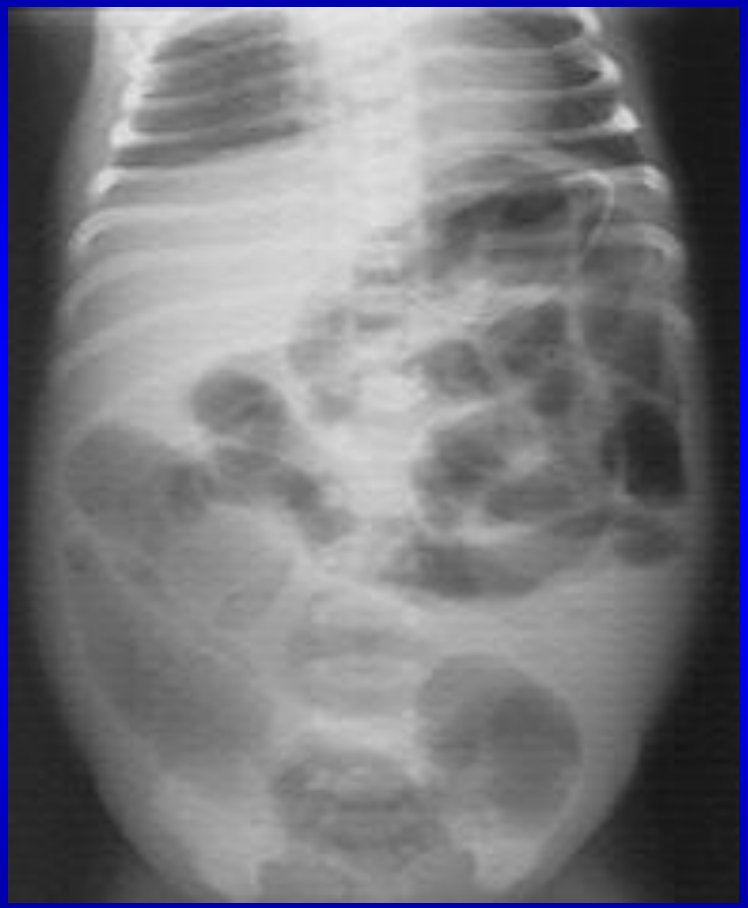


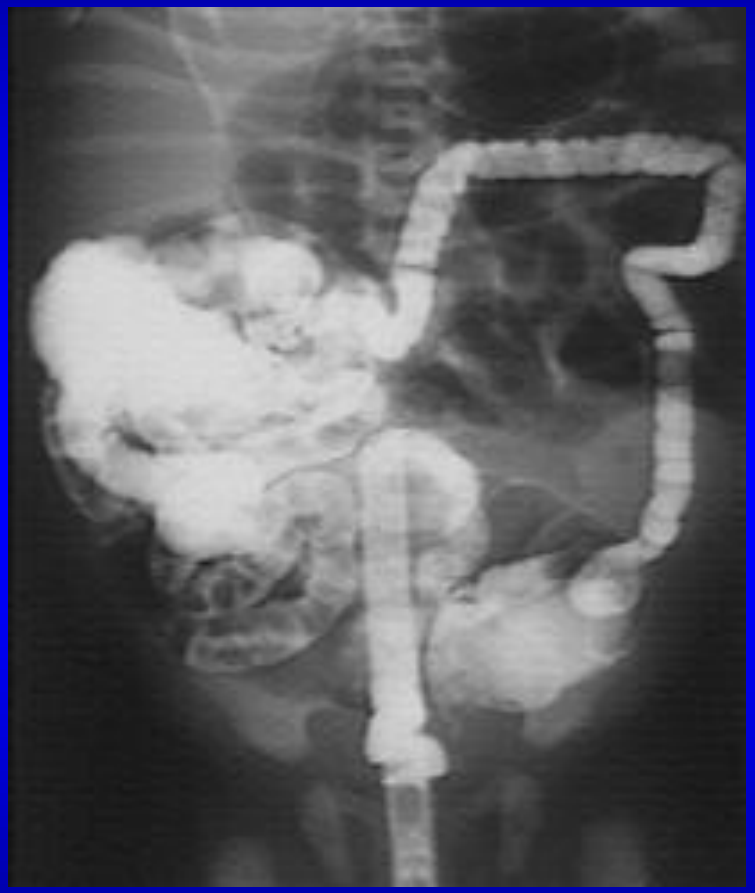
Meconium Ileus



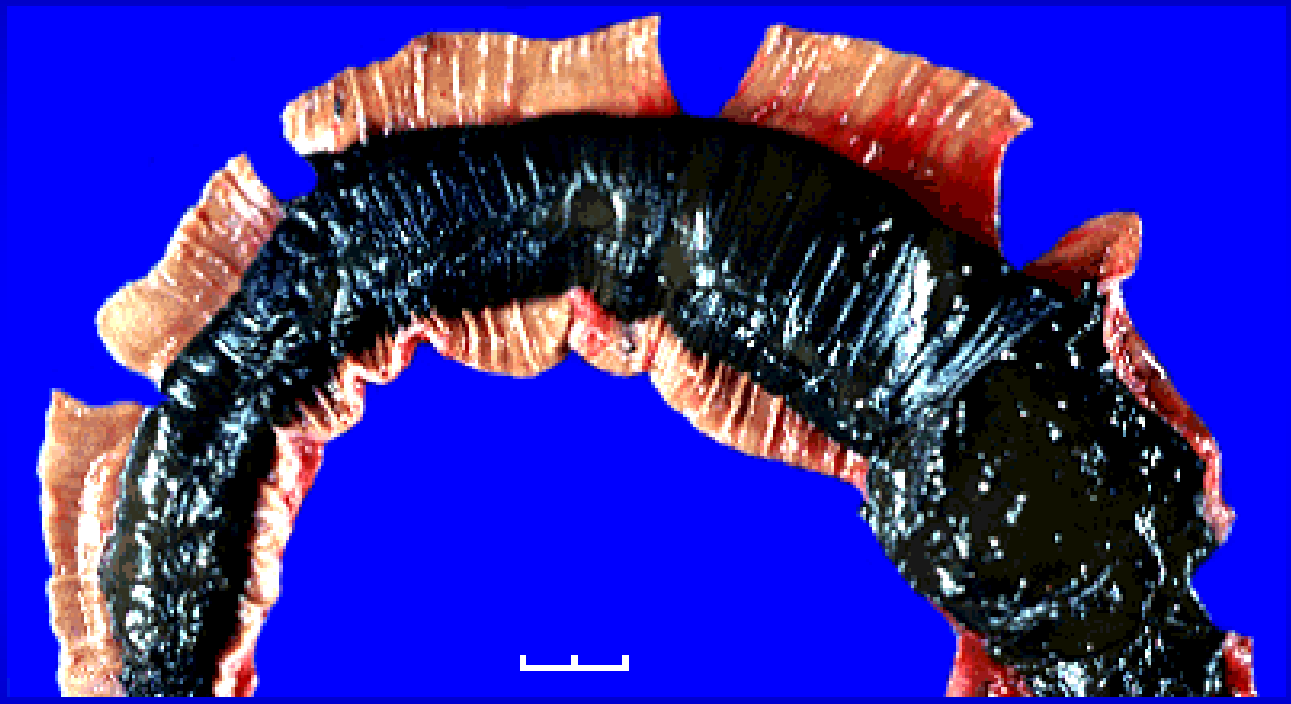
Viscous meconium impacts in the terminal ileum causing intestinal obstruction

Meconium Ileus



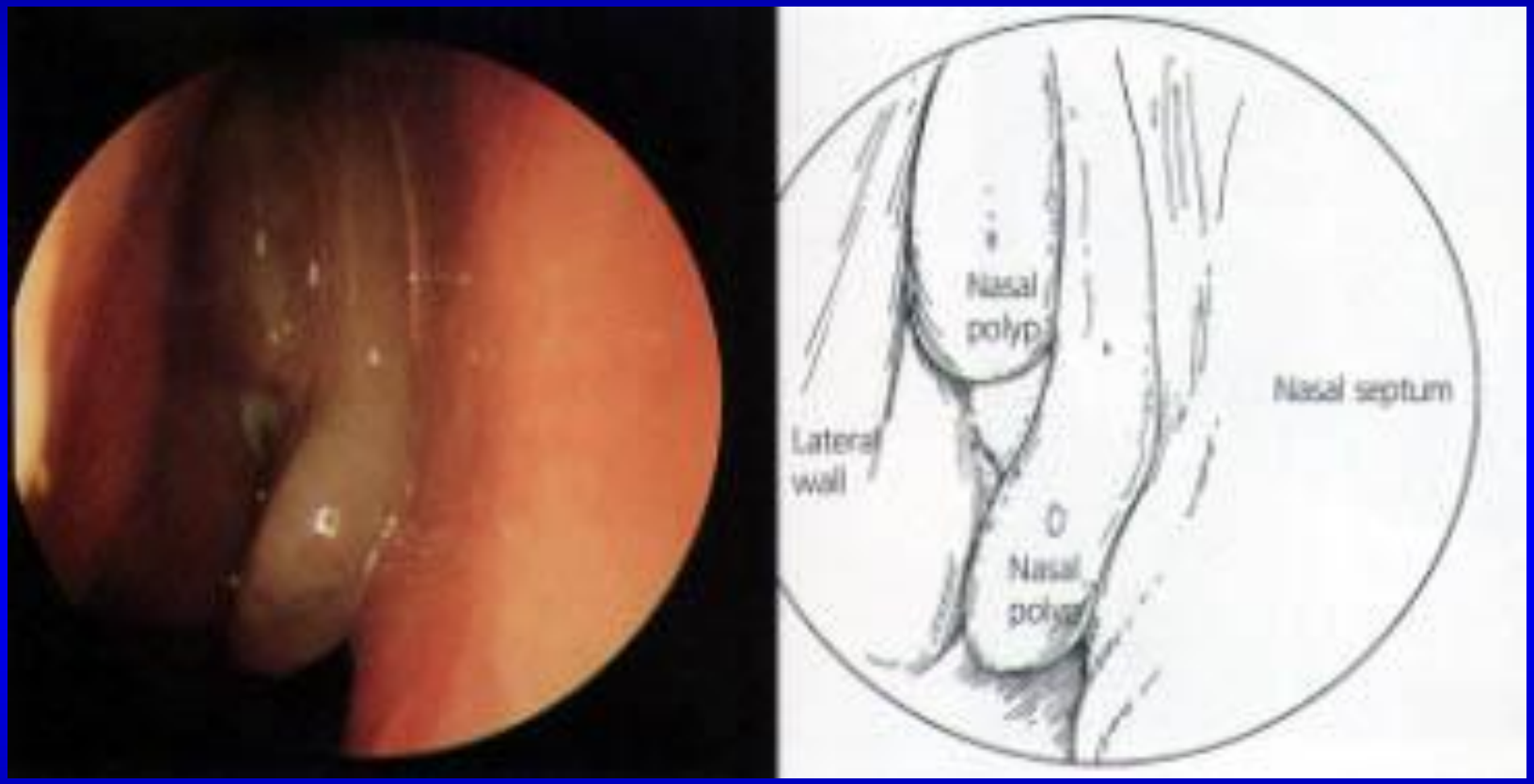


Meconium



Rectal Prolapse

Childhood –Upper Airway



Nasal polyps in the right nostril, blocking the osteomeatal complex.

Haemolytic Anaemia and Ascites

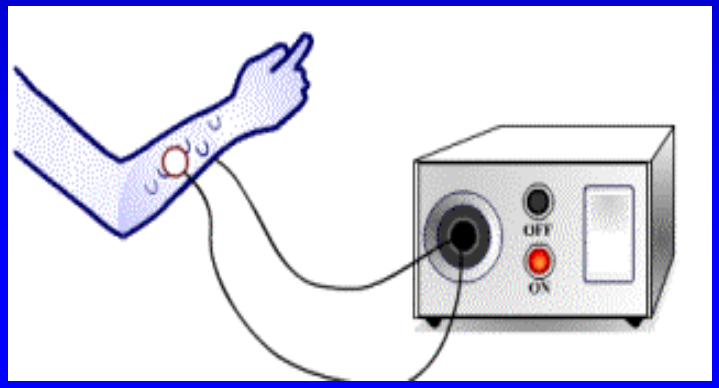
- Biochemical disturbance:
  - Haemoglobin 7g/dl, 8% reticulocytes
  - Albumin 24g/L, Protein 44g/L
  - Acanthocytosis
- Hypoproteinaemia with ascites, pistachio green stools

Hypokalaemic, hyponatraemic metabolic alkalosis –Pseudo Bartters Syndrome

- Sodium 132mmol/L, Chloride 85mmol/L, Potassium 2.6mmol/L, Creatinine 38.
- Urinary Sodium 2mmol/L
- pH 7.52, PCO_2 4.5kPa, PO_2 11kPa, HCO_3 44

Diagnostic testing

Sweat Test



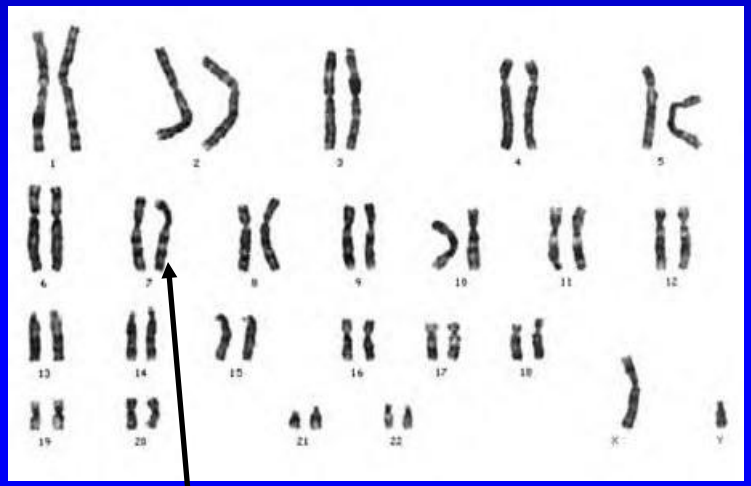
- Sweat Testing - When CF is suspected a sweat test is carried out measure the amount of salt in the sweat.
- Children with CF have more salt in their sweat than normal. Whenever a diagnosis is made any family members with symptoms can be offered a sweat test to rule out the possibility that they too have CF.

Sweat Test Results

- **Chloride levels:**

<40 mmol/l	normal
40-60 mmol/l	equivocal
>60 mmol/l	consistent with CF

Genotyping



The CF Gene is on the long arm of Chromosome 7

- Genetic testing -

A sample of cells is obtained by taking either a blood sample or by rubbing the inside of the cheek with a brush. Specimens are analysed for the CF gene mutations that are known to be common in the local population.

When to suspect CF ?

Poor weight gain and ……

1. Salty taste

2. Abnormal stools

3. Chronic wet cough

Diagnosed CF

Undiagnosed CF