

# A Case of Multiple Acyl Dehydrogenase Deficiency (Glutaric Aciduria II)



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## 3 day old baby

No facial congenital anomalies

Absent moro, suck & grasp reflexes  
Hepatomegaly

"Strange, cheesy smell, like rotten sweaty feet"



Uneventful birth  
Since age 24 hours  
Persistent hypoglycaemia  
Respiratory distress  
Poor feeding, lethargy  
↓ level of consciousness  
Hypotonia

Progressive neurological deficit  
Respiratory distress  
Acute renal failure  
Cardiac arrest Day 6

Glucose <2.2mmol/L  
Glucose infusion:  
>4.7

Metabolic acidosis  
(pH 7.3; HCO<sub>3</sub><sup>-</sup> 16.5mmol/L)  
Elevated anion gap  
Lactate N  
Ketones absent

Ammonia 265umol/L

CRP<1  
Blood cultures neg

**Urine & serum amino acids:**  
↑lysine, sarcosine

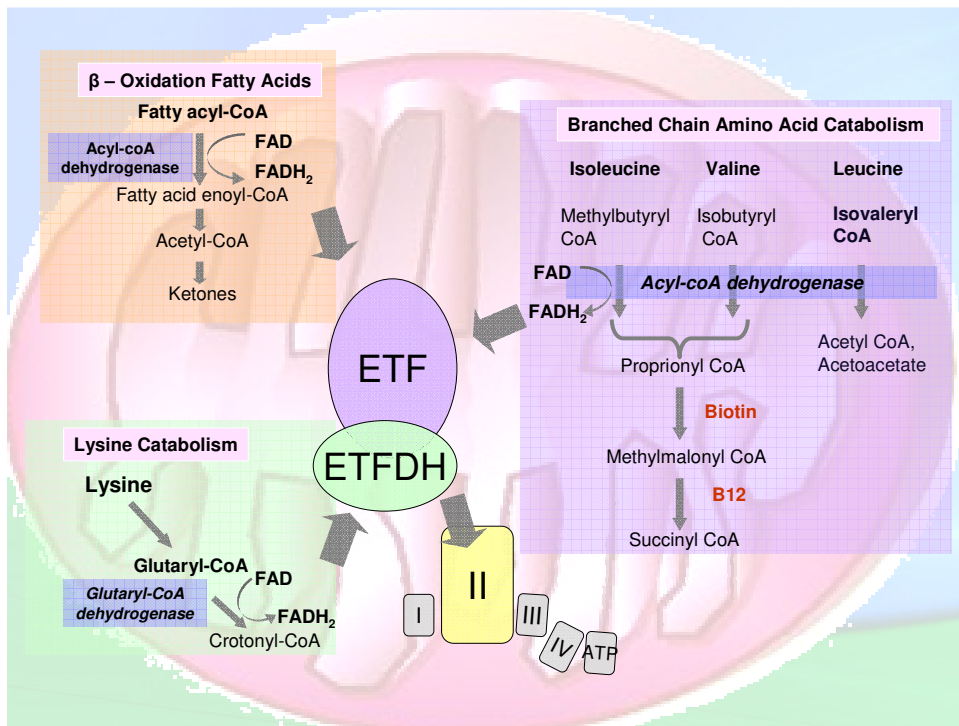
**Urine organic acids:**  
**Metabolites of fatty acids:**  
↑↑↑ dicarboxylic acids including  
Glutaric acid  
3-OH-isovaleric acid  
**Glycine conjugates of branched chain amino acid metabolites:**  
Isovaleryl-, methylbuteryl-, & isobutyrylglycine  
other dicarboxylic acids, Isovalerylglycine

↓↓ **Fatty acid oxidation (cultured fibroblasts)**  
Myristic acid 0.7nmol/h/mg prot (C 4.01)  
Palmitic acid 0.13nmol/h/mg prot (C 9.15)  
Oleic acid 0.14nmol/h/mg prot (C2.23)

**MULTIPLE ACYL DEHYDROGENASE DEFICIENCY (MADD)**

## Multiple Acyl Dehydrogenase Deficiency (MADD)

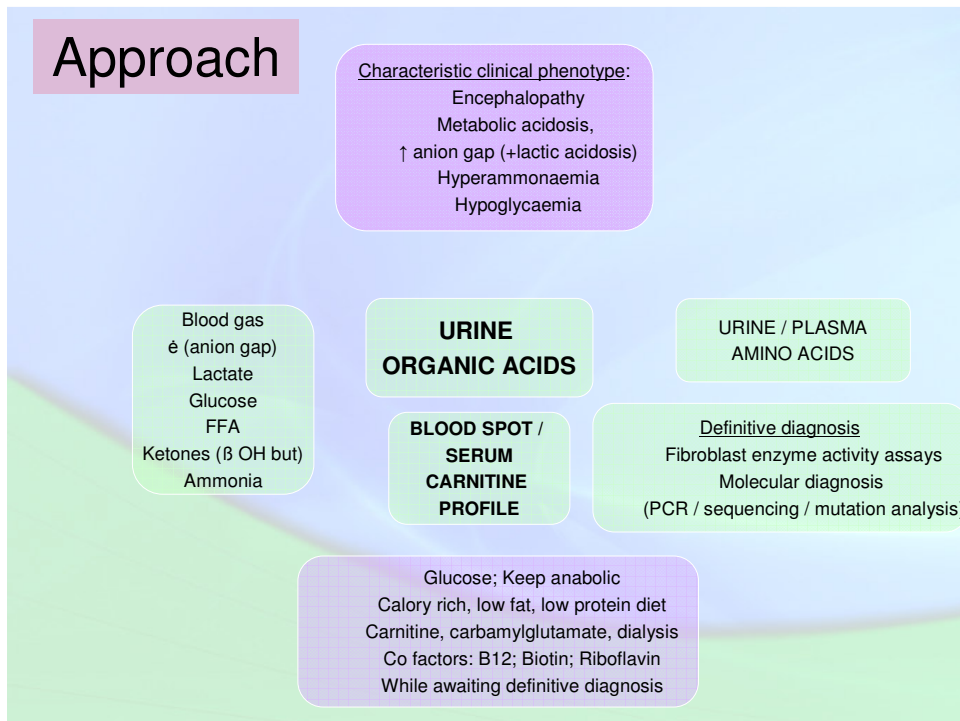
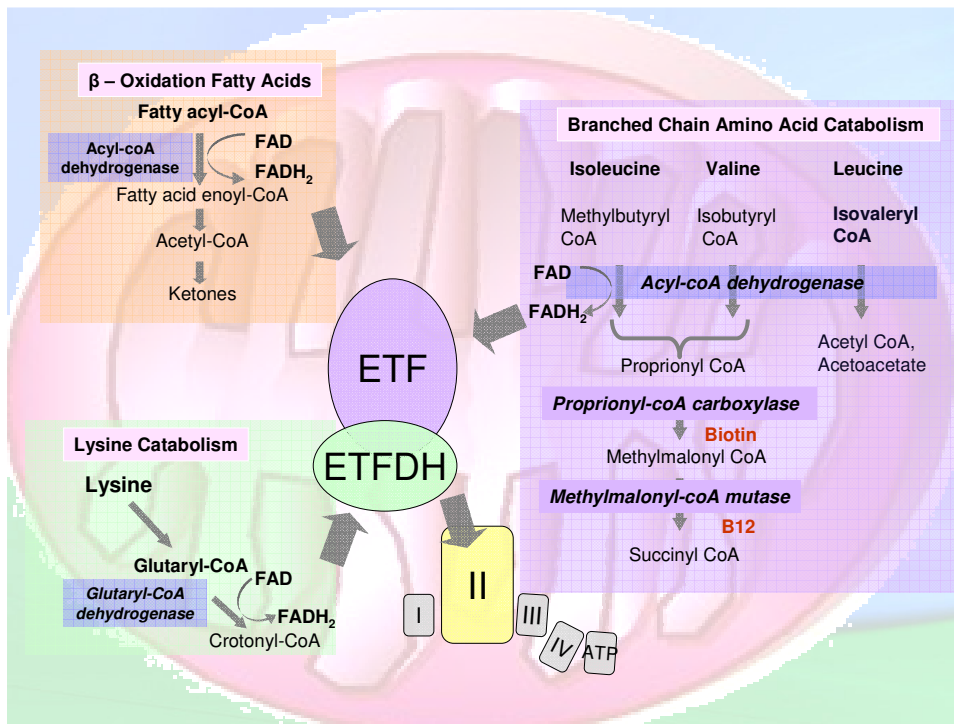
- Incidence – no accurate figures - “not so rare” autosomal recessive
- Three groups:
  - Neonatal with congenital anomalies
    - Congenital facial anomalies and cystic kidneys
  - Neonatal without anomalies
  - Mild / later onset
- Characteristic findings (neonatal)
  - Typical presentation 24 – 48 hours
  - Hypotonia
  - Hepatomegaly
  - Severe nonketotic hypoglycaemia
  - Metabolic acidosis, raised anion gap
  - Sweaty feet odour
- Other biochemical features
  - Mild / moderate hyperammonaemia
  - Organic aciduria, altered free:acylcarnitine
  - Liver: transaminitis, prolonged prothrombin time / partial thromboplastin
- Other clinical features
  - Cardiomyopathy
  - Brain atrophy
  - Kidneys cystic/enlarged
- Histological features
  - Fatty degeneration liver parenchymal cells, renal tubular epithelium and myocardium
- Death within first week of life
- Later onset:
  - Recurrent episodes vomiting, hypoglycaemia & metabolic acidosis precipitated by metabolic stress
  - Muscle weakness, myalgia



## Approach

Characteristic clinical phenotype:

- Encephalopathy
- Metabolic acidosis,
- ↑ anion gap (+lactic acidosis)
- Hyperammonaemia
- Hypoglycaemia



# Acknowledgements

Dr Steven Delpont  
Department of Paediatrics  
Red Cross Children's Hospital  
University of Cape Town

Dr Helen Wainwright  
Division of Anatomical Pathology  
University of Cape Town

Dr George van der Watt  
Division Chemical Pathology  
Red Cross Children's Hospital  
University of Cape Town

References available on request.