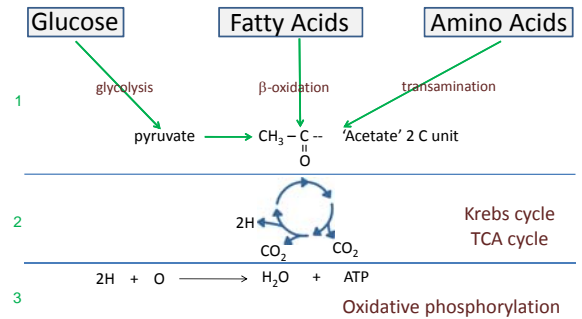


## Oxidative Phosphorylation (Cytochrome Chain)

Barbara Moreland



## Catabolism of sugars, fats & amino acids occurs in 3 stages

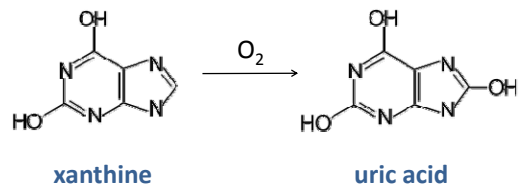


## Examples of oxidation reactions

1. Add  $\text{O}_2$  directly to the molecule (rare event in metabolism)

## Oxidation example 1

### Direct addition of $\text{O}_2$

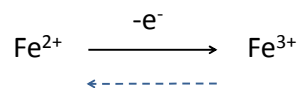


## Examples of oxidation reactions

1. Add  $\text{O}_2$  directly to the molecule (rare event in metabolism)
2. Remove one electron  $e^-$

## Oxidation example 2

### Removal of one electron



Reduced form  
(bright red)

Oxidised form  
(brown)

Iron in haemoglobin or cytochrome proteins

## Examples of oxidation reactions

1. Add O<sub>2</sub> directly to the molecule (rare event in metabolism)
2. Remove one electron e<sup>-</sup>
3. Remove a pair of hydrogen atoms

## Oxidation example 3

### Hydrogen transfer



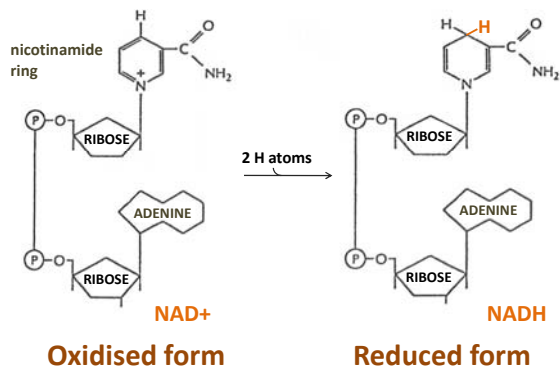
Reduced form    Oxidised cofactor    Oxidised product    Reduced cofactor

Cofactor required as hydrogen acceptor

Examples of hydrogen acceptor cofactors

NAD<sup>+</sup>    FAD    NADP<sup>+</sup>

## Nicotinamide adenine dinucleotide



## Flavin adenine dinucleotide

