**3 *Microbial metabolism***

Metabolism encompasses all enzyme-catalysed reactions

of a cell, and can be divided into **primary** and **secondary**

processes. Primary metabolic pathways are largely common to most organisms. They involve both energy-generating metabolism, referred to as **catabolism**, and **anabolism**, which utilizes this energy in the biosynthesis of cellular components for growth and

maintenance. Catabolism and anabolism are considered separately for convenience, but are highly integrated processes. Products of primary metabolism that are of particular industrial importance include alcohols, amino acids, organic acids, nucleotides, enzymes and microbial cells (biomass).

**Catabolism**

**Respiration**

**Fermentations**

**Catabolism of lipids and proteins**

**Energy storage**

**Anabolism: the synthesis of biomolecules**

**Biosynthesis of nucleotides and nucleic acids**

NUCLEIC ACIDS

**Biosynthesis of amino acids and protein**

**Biosynthesis of monosaccharides and polysaccharides**

PEPTIDOGLYCAN BIOSYNTHESIS

**Biosynthesis of fatty acids and lipids**

**Autotrophy**

**Photoautotrophy**

ANOXYGENIC PHOTOSYNTHETIC BACTERIA

OXYGENIC PHOTOSYNTHESIS

**Chemolithotrophic autotrophy**

**Methylotrophic metabolism**

**Metabolic regulation**

**Modification of enzyme activity**