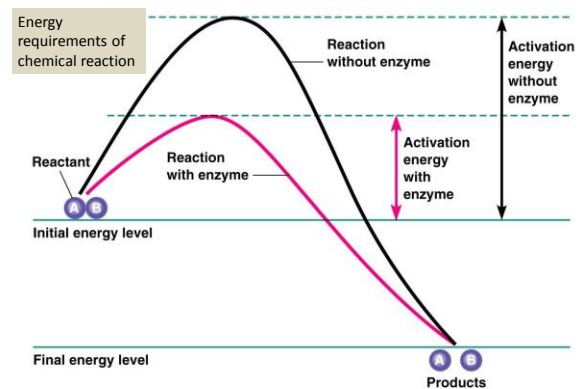
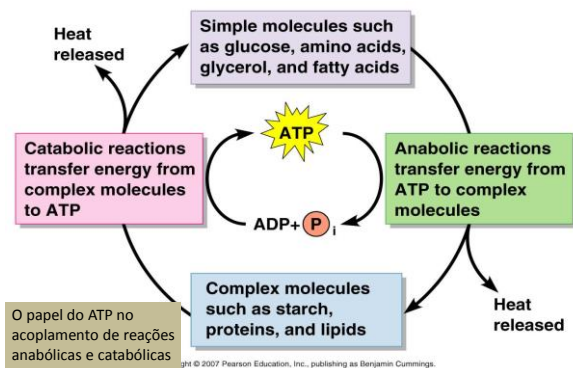


A5-Metabolismo Bacteriano

- Diferenciar anabolismo e catabolismo
- ATP
- Enzimas
- Vias metabólicas

Chemical processes that form the basis of all cellular metabolism

- Enzyme-mediated catalysis
- Reaction coupling
- Energy harvesting by redox reactions
 - organic substrates
 - inorganic substrates
 - photochemical reactions
- Use of membranes to form charge gradients and chemical concentration



Escherichia coli K12

Genome
4 639 221
genes
4377
4290 proteins
87 RNAs

Table 5.2 Gene products of *Escherichia coli* associated with various metabolic processes

Functional category	No. of genes
Metabolism of small molecules	
Degradation and energy metabolism	316
Central intermediary metabolism	78
Broad regulatory function	51
Biosynthesis	
Amino acids and polyamines	60
Purines, pyrimidines, nucleosides, and nucleotides	98
Fatty acids	26
Metabolism of macromolecules	
Synthesis and modification	406
Degradation	69
Cell envelopes	168
Cell processes	
Transport	253
Other, e.g., cell division, chemotaxis, mobility, osmotic adaptation, detoxification, and cell killing	118
Miscellaneous	107
Total	1,894

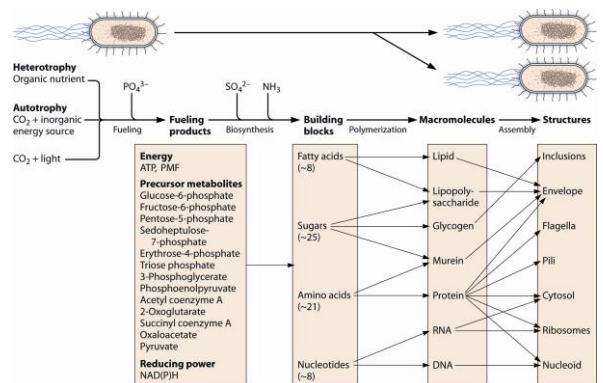
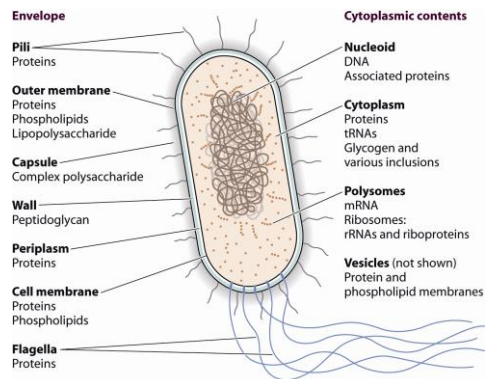


Table 5.4 Some cellular activities requiring energy**Cellular activity****Growth related**

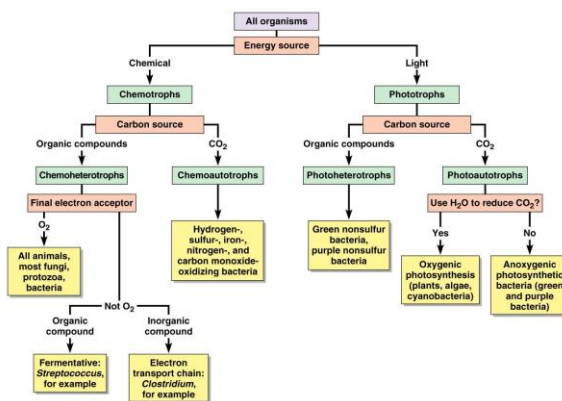
Entry of nutrients
 Biosynthesis of building blocks
 Polymerization of macromolecules
 Modification and transport of macromolecules
 Assembly of cell structures
 Cell division

Growth independent

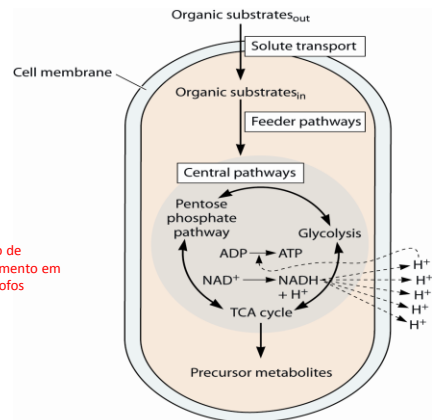
Motility
 Secretion of proteins and other substances
 Maintenance of metabolite pools
 Maintenance of turgor pressure
 Maintenance of cellular pH
 Repair of cell structures
 Sensing the surroundings
 Communication among cells

Table 5.3 Overall composition of an average *Escherichia coli* cell

Substance	% of total dry wt
Macromolecules	
Protein	55.0
RNA	20.4
23S RNA	10.6
16S RNA	5.5
5S RNA	0.4
Transfer RNA (4S)	2.9
Messenger RNA	0.8
Miscellaneous small RNAs	0.2
Phospholipid	9.1
Lipopolysaccharide	3.4
DNA	3.1
Murein	2.5
Glycogen and other storage material	2.5
Total macromolecules	96.1
Small molecules	
Metabolites, building blocks, vitamins, etc.	2.9
Inorganic ions	1.0
Total small molecules	3.9

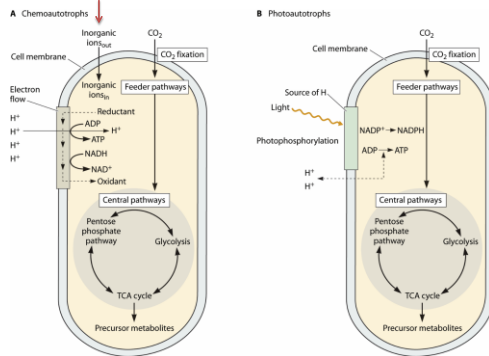


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Processo de
 abastecimento em
 heterótrofos

Processo de abastecimento em autótrofos



An overview of respiration and fermentation

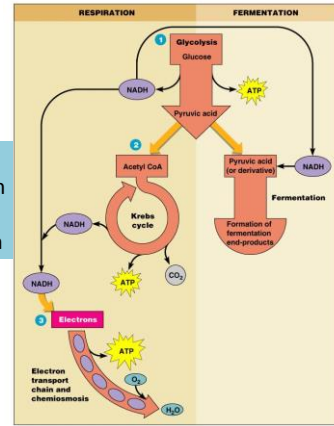
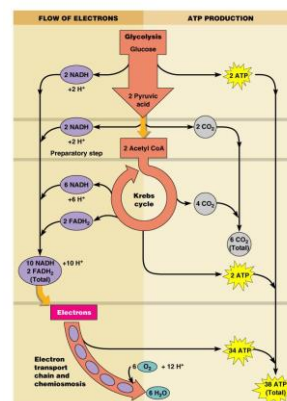


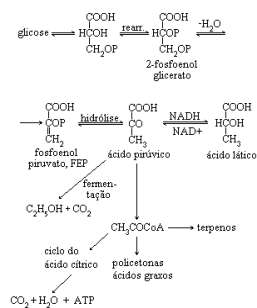
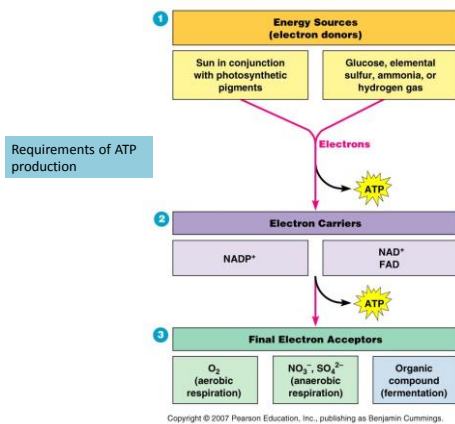
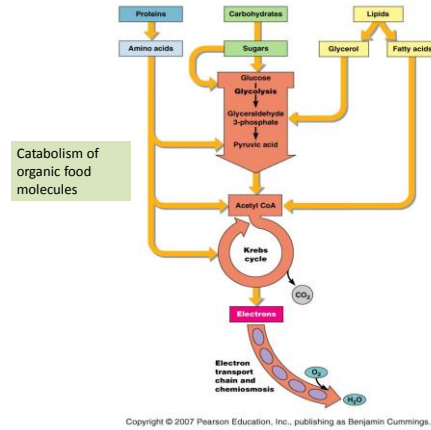
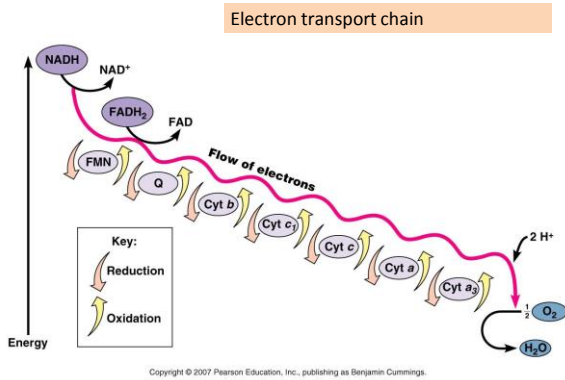
TABLE 5.3 ATP Yield During Prokaryotic Aerobic Respiration of One Glucose Molecule

Source	ATP Yield [Method]
Glycolysis	
1. Oxidation of glucose to pyruvic acid	2 ATP [substrate-level phosphorylation]
2. Production of 2 NADH	6 ATP [oxidative phosphorylation in electron transport chain]
Preparatory Step	
1. Formation of acetyl CoA produces 2 NADH	6 ATP [oxidative phosphorylation in electron transport chain]
Krebs Cycle	
1. Oxidation of succinyl CoA to succinic acid	2 GTP (equivalent of ATP; substrate-level phosphorylation)
2. Production of 6 NADH	18 ATP [oxidative phosphorylation in electron transport chain]
3. Production of 2 FADH ₂	4 ATP [oxidative phosphorylation in electron transport chain]
Total: 38 ATP	

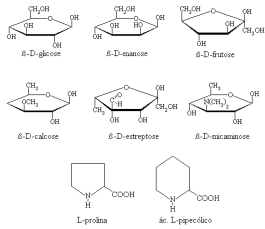
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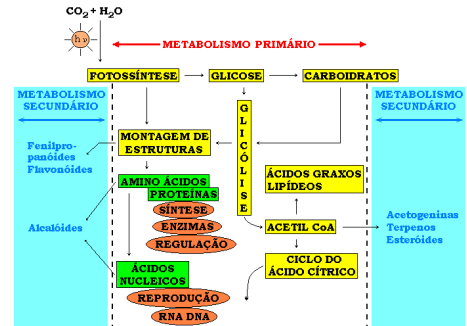
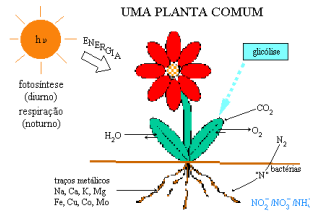


Metabolismo primário e secundário

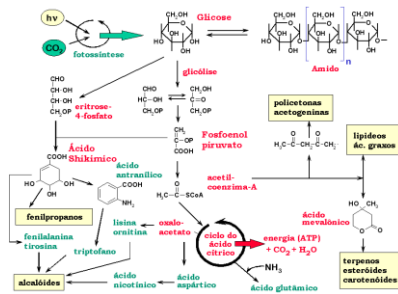


Metabolismo de glicosídeos e aminoácidos

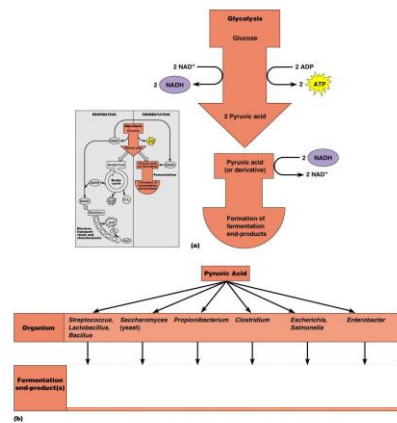
Metabolismo primário



Metabolismo primário e secundário

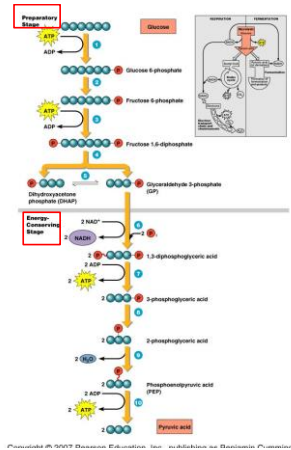


Metabolismo primário e secundário



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Reactions of glycolysis
Embden-Meyerhof
pathway



The Krebs cycle

