Use of languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Prerequisites

The student must have successfully completed Microbiology and Biochemistry from the Microbiology degree, or subjects of equivalent content.

Objectives and Contextualisation

The aim of the course is to provide the student with an overall vision of the operation of the different processes that allow growth of prokaryotic cells as well as their adaptation to a changing environment. In the first part of the course, the main elements of the process of structure building and cell growth are presented hierarchically: biosynthesis, polymerization of macromolecules, formation of structures, transport and secretion processes. Emphasis is made in the quantitative assessment of the impact of these processes on global growth expenditure. The subject describes the different mechanisms of energy generation necessary to cover growth expenses. In this part, students learn how to make predictions about the viability of certain metabolic reactions, as well as the tools to determine the energy performance of different types of metabolism. Finally, the student is introduced to some of the elements needed to carry out microbial physiology studies: work with continuous bioreactors, analysis of metabolic budgets and calculation of metabolic rates from steady state data.

Content

1.-Composition of the bacterial cell.


2.-Diversity and relative abundance of cellular components I


3.-Diversity and relative abundance of cellular components II

4.-Cellular Envelopes I


5.-Cellular Envelopes II


6.-Structure and formation of the cytoplasm components.


7.- Protein secretion i prokaryotes.

Importance of protein secretion systems. Secretion to the periplasmic space: type II (Sec) secretion systems. Fate of the proteins secreted to the periplasmic space. Self-secreted proteins. Biogenesis of Pili. Main terminal branch (MTB). Direct secretion beyond the external cell membrane: type I, III, IV and V secretion systems.

8.-Energetic cost of cellular construction


9.- Bioenergetics and electron transport chains


10.-Use of organic substrates


11.-Fermentative metabolism