



# UE3 Microbial response to stress and environmental changes



Niveau d'étude  
BAC +4



ECTS  
9 crédits



Composante  
UFR Sciences  
Vie Terre  
Environnement

## Présentation

### Description

This module provides an in-depth understanding of the adaptation of microorganisms to changing environmental conditions. Microorganisms are rarely in their optimal growth conditions and must therefore constantly adapt. Their circulation in different environments (soil-food-human continuum) requires the implementation of adaptation mechanisms allowing them to resist to sometimes drastic conditions.

The objective of this module is therefore to detail the adaptation mechanisms available to microorganisms at the molecular and physiological levels, based on examples taken from different fields, with in particular the study of the adaptation of probiotic bacteria to the gastrointestinal tract or the establishment of resistance to antibiotics with the consequences on health. The capacity to adapt to the environment will also be studied in the context of bioremediation.

The teaching will be divided into lectures allowing the students to acquire fundamental notions. Then, the acquired knowledge will be applied to the realization of theoretical and experimental projects, allowing the students to acquire important technical skills.

Programm :

#### Lectures (20h)

Stress response and adaptation (6h).

Oxidative stress (2h).

Structural microbiology (2h).

Adaptation of soil microorganisms to biodegradation and resistance to different xenobiotics (2h).

#### Tutorials (8h)

Analysis of articles (writing and oral presentation).



## Practice (20h)

Stress response and adaptation studied using microbiological methods and molecular biology.

Microbial ecology of soil systems disturbed by heavy metals (2h).

Antibiotics and alternatives (4h).

Transfer of antibiotic-resistant pathogenic bacteria between animals, the environment and humans (2h).

## Objectifs

Applying theoretical concepts of microbiology and microbial stress response.

Conceiving and preparing experiments on microbial stress response.

Handling and following a protocol with respect to health, safety and sterility rules.

Obtaining, analyzing and validating experimental results to draw conclusions.

Analyzing, interpreting and reporting scientific data on microbial stress response in the context of current research, presenting them in English to a scientific audience.

## Heures d'enseignement

|    |                   |     |
|----|-------------------|-----|
| CM | Cours Magistral   | 20h |
| TD | Travaux Dirigés   | 8h  |
| TP | Travaux Pratiques | 20h |

## Modalités de contrôle des connaissances

### Évaluation initiale / Session principale

| Type d'évaluation     | Nature de l'évaluation | Durée (en minutes) | Nombre d'épreuves | Coefficient de l'évaluation | Note éliminatoire de l'évaluation | Remarques |
|-----------------------|------------------------|--------------------|-------------------|-----------------------------|-----------------------------------|-----------|
| CC (contrôle continu) | CC : Ecrit et/ou Oral  |                    |                   | 9                           |                                   |           |



# Infos pratiques

---

## Campus

➤ Campus de Dijon