

Histology and Histopathology of Aquatic Animals

Synopsis

Topics covered will include the description of the normal and pathological histology of marine invertebrates and fish, with special emphasis on the effects of chemical pollutants and other sources of environmental stress.

Aims

- To describe the normal and pathological histology of marine animal species: mainly fishes, molluscs and crustaceans.
- To identify histopathological alterations of viral, bacterial, parasitic and toxic (due to pollutant exposure) etiology
- To characterise the cellular and molecular mechanisms involved in pathological damage and organismal defense.

Objectives

At the end of the unit, you should:

1. be familiar with the form and function of organs and tissues in aquatic animals (comparative histology)
2. understand the normal histological organisation of target tissues in molluscs (integument, kidney, blood, digestive gland)
3. understand the normal histological organisation of target tissues in marine fishes (integument, kidney, spleen, blood, liver)
4. recognise major parasites and pathological lesions in molluscs and fish
5. know the value of histopathology in ecosystem health monitoring and marine pollution assessment

Key Skills Acquired

At the end of the unit, you should be able to:

1. conduct histological processing of marine animal tissues
2. identify normal tissues and cell types at the light microscope in marine molluscs and fish
3. identify major parasites and histopathological lesions in marine molluscs and fish
4. search in the web and literature the relevant information concerning molluscs and fish disease, with emphasis in environmentally relevant syndromes

Syllabus

1.- Laboratory practicals

In the Seminar on Histotechnology the students will learn in groups how to prepare microscopical slides. They will start with the dissection of biological material, to follow with tissue processing (fixation, dehydration, wax embedding, microtomy and staining) and observation. On line questionnaire will be used for practical assessment.

2.- Microscopic practicals.

The students will observe individually a series of microscopic slides using microscopes regarding normal histology of molluscs (2), histopathology of molluscs (3), normal histology of fishes (4) and histopathology of fishes (5). The main objective is to assess the pathological status of aquatic organisms and to understand the normal and the affected situations regarding alterations and parasite presence.

3.- Selection of topics

The 6th practical session will serve to find individually all the information available in the web to select and define a project related with the objectives of the module (see next activity: Project based on questions). The students will present to the entire classroom the title and the objectives of the project to carry out. They will discuss in-group the aim of the proposed projects and will define them to avoid overlaps.

Learning & Teaching

- Lectures: 22 hr
- Practical sessions (laboratory): 6 hr
- Practical sessions (microscopy): 10 hr
- Practical sessions (computer): 2 hr

Teaching Staff : M Soto (Coord.), Jose A. García-Cabrera (UCM), Beñat Zaldibar (UPV/EHU), Urtzi Izaguirre (UPV/EHU), Nerea García (UPV/EHU), Isabelle Arzul (IFREMER). Collaborators: Tifanie Briauudeau, Denis Benito

Semester: 2

Timetable slot: To be advised

ECTS: 4

Level: Optional

Bibliography

- Pathobiology of marine and estuarine organisms. Couch, JA; Fournie, JW. CRC Press, Boca Raton, Florida, USA, 1993.
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- Systemic fish pathology. Ferguson, HW. Iowa State Univ. Press, 1989.
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- Fish as sentinels of environmental health. Murchelano, RA. NOAA, US Dept, Commerce, Woods Hole MA, USA, 1988.
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 - Fish diseases and disorders. Vol 1. Protozoan and metazoan infections. Woo, PTK. CABI Publ., Oxon, UK, 1995
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http://nria.fra.affrc.go.jp/RCFD/histological-methods_e.html
<https://vetbooks.ir/atlas-of-fish-histology/>
<http://www.seagrant.umaine.edu>
<https://www.pac.dfo-mpo.gc.ca/index-eng.html>
<http://pathology.iim.csic.es>
<https://www.youtube.com/watch?v=7Y8sgzpDQJg>
<https://www.britannica.com/animal/fish/Excretory-organs>

Assessment

- Attendance is compulsory. Proactive participation in the activities, practical and oral sessions, will be considered.
- Practical questionnaire on Histotechnology (20%)
- Practical examination (30%)
- Project Based on questions (Written report, 50%)

Course Evaluation

By completion of University Unit Evaluation Questionnaire by students, annual assessment by Unit Coordinator.