

**Physiological responses of
terrestrial isopods to pollutants**
/ histological parameters as a
measure of stress

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INTRODUCTION

Terrestrial isopods are one of most studied organisms in
terrestrial ecotoxicology.

- **basic principles** of toxic action of chemicals in terrestrial environment
- **biomonitoring** of industrially polluted environment
- **toxicity testing** of new and existing chemicals in terrestrial environment

“Cheeselips” Mouffet (1634)



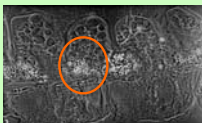
*INSECTORUM SIVE MINIMORUM
ANIMALIUM THEATRUM*

MULTIPLE LEVEL BIOMARKER
RESPONSE



Activity of:

- AChE
- Glutathione-S-transferase
- Glutathione peroxidase
- Glutathione reductase
- energy reserves
(lipids, proteins, glycogen)



→ metal accumulation



- feeding
- moulting
- behaviour



→ tissue level
response





AIM

→ histological parameters of digestive gland epithelium as a measure of stress /

→ as *tissue level biomarker* of stress

Part A: What do we want to evaluate?

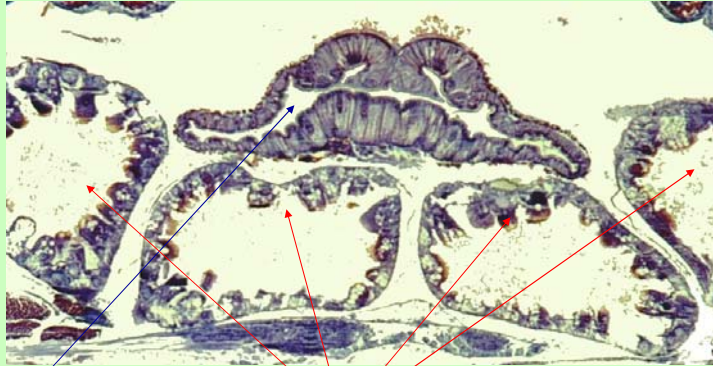
Part B: What could be an optimal study design?

Part C: What methods are preferable?

* OECD Fish Drafting Group / a protocol for the histological analysis of endocrine disruption in fish

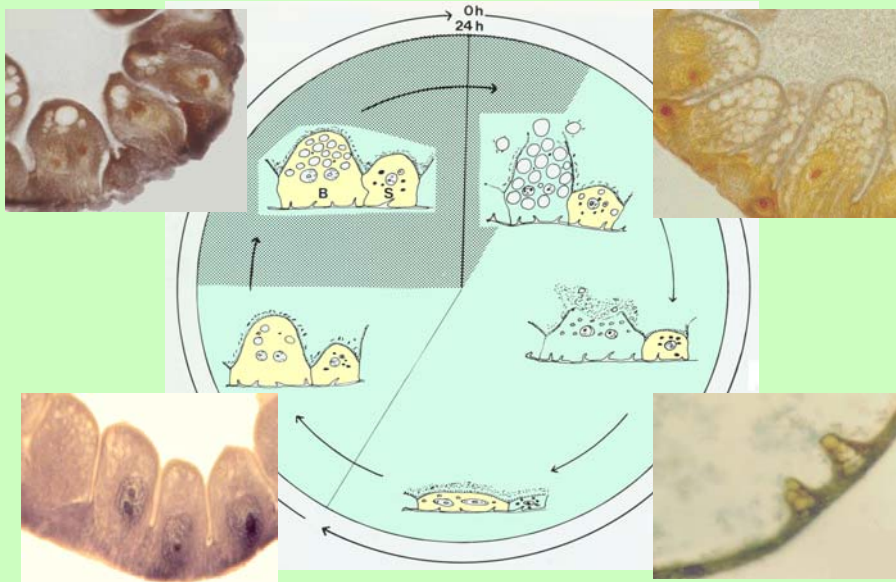
Part A: What do we want to evaluate?

↳ histological parameters of digestive glands after exposure to stress

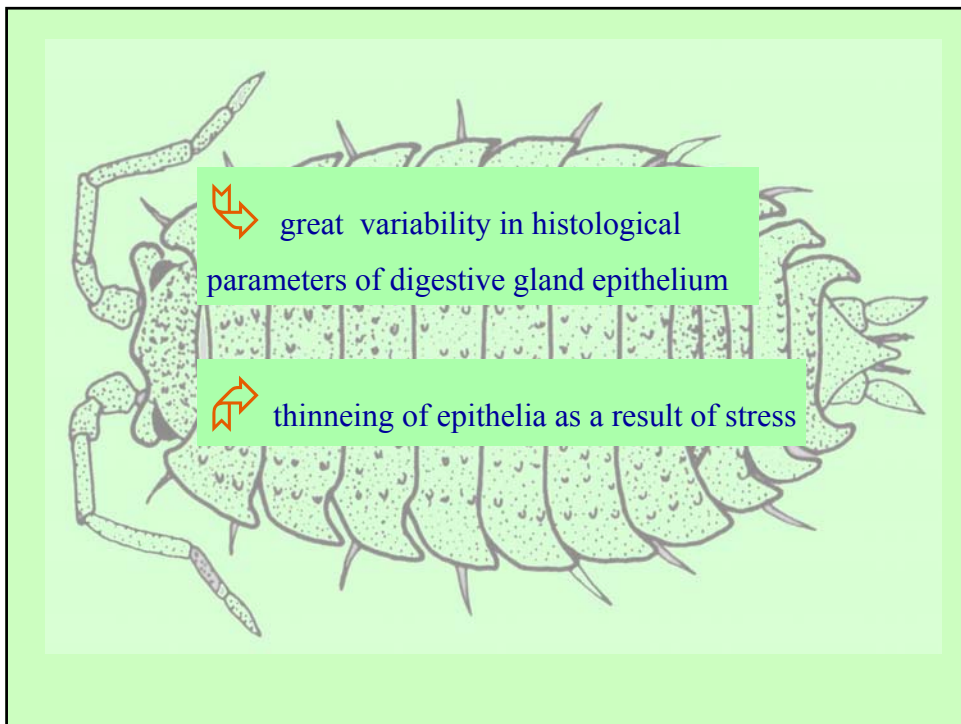


gut

hepatopancreas



→ one type of cell with several functional stages



MATERIALS AND METHODS

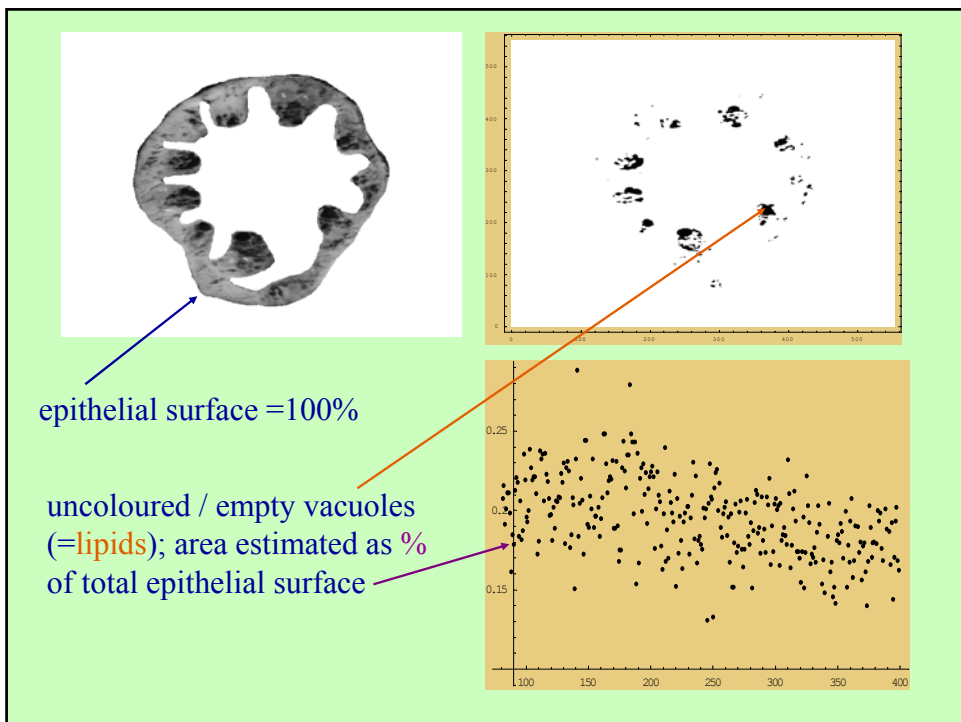
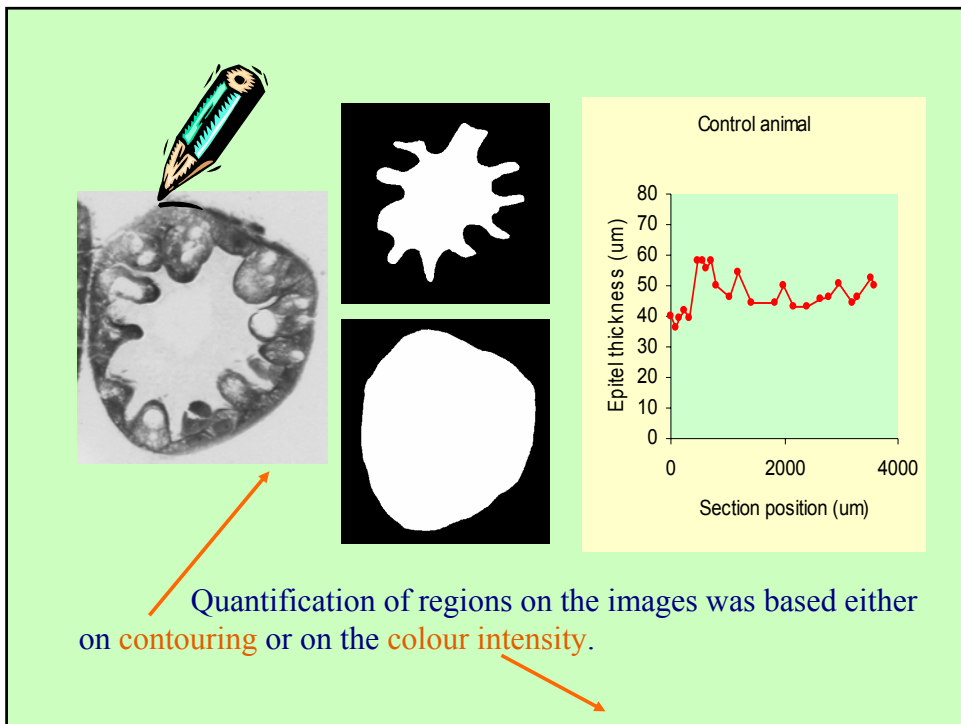
Part B: What could be an optimal study design?

↔ toxicity testing protocol with *Porcellio scaber*



Part C: What methods are preferable?

↔ serial histological sections of hepatopancreas
↔ program in *Mathematica* to align, analyze and reconstruct serial sections (analyzed up to 600 images (400 x 750 pixels) per animal)



RESULTS



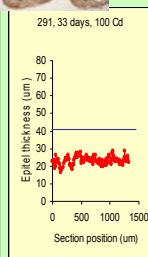
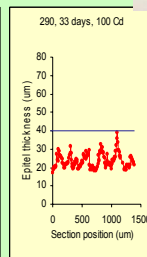
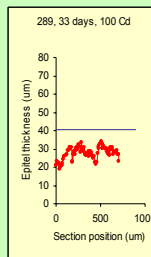
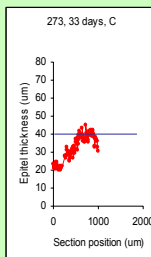
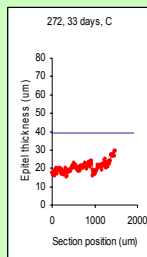
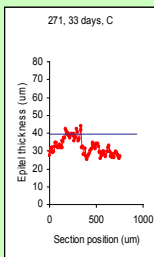
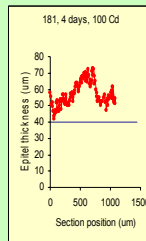
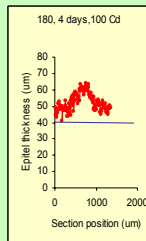
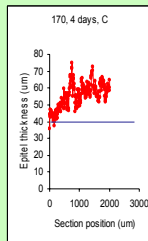
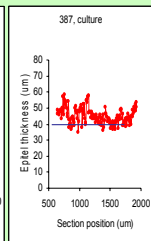
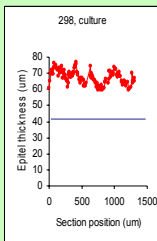
variability of histological parameters
of digestive gland epithelium / *differences*
between stressed and control animals



thinning of epithelia / *significant* in stressed animals



reduction of lipids / *significant* in stressed animals



DISCUSSION

Cd, Zn
Hg,
diazinon
exposure



Morphometric parameters of hepatopancreas:
a tool for quantification of the state of the animal -
being under a stress or not

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