

PRELIMINARY EVALUATION OF METAL CONTAMINATION IN BENTHIC FISHES OF THE GULF OF TIGULLIO (NORTH-WESTERN ITALY)



ANNA REBOA, LUCA VIOLA, MARCO
CAPELLO, LAURA CUTRONEO, GRETA
VAGGE, ALBERTA MANDICH

DISTAV, UNIVERSITY OF GENOVA, 2017

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HEAVY METALS

AFTER THE INTAKE,
THEY COULD:

- Remain in water column
- Get adsorbed on sediment
- Taken up by aquatic fauna

WHY DANGEROUS:

- Toxicity
- Bioaccumulation tendency
- Biomagnification through the food chain



AIM OF THE STUDY

Use of fishes as biomonitors to assess the health of the aquatic ecosystem

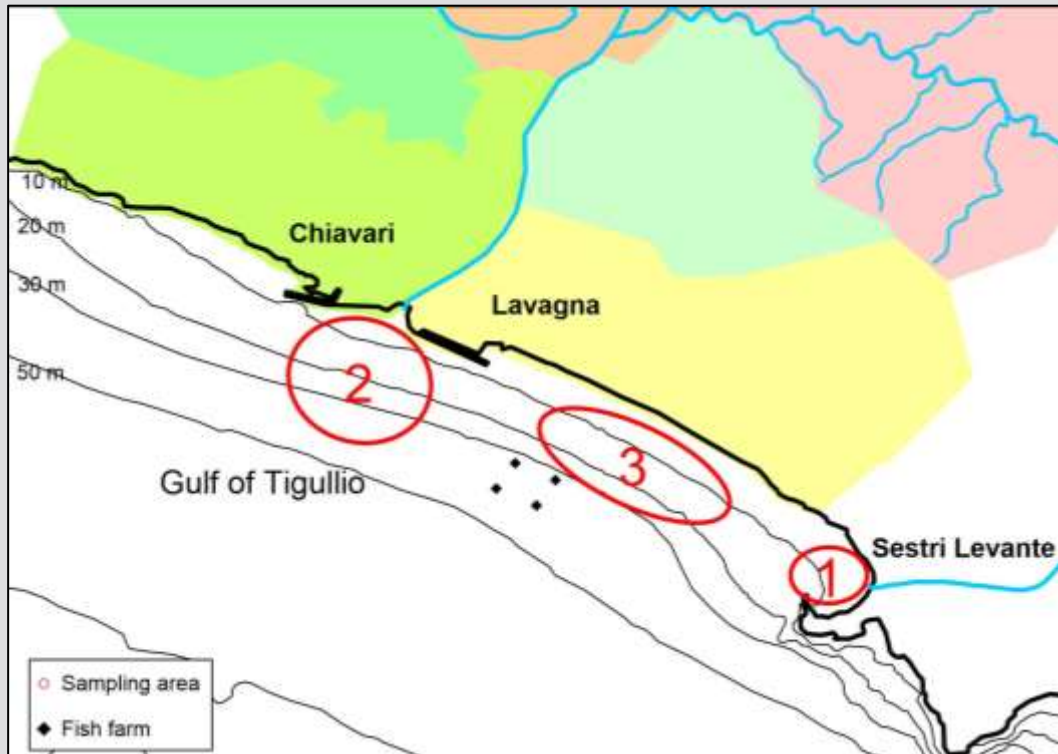
WHY FISHES?

- Key role in aquatic ecosystem
- At the top of the food chain
- Relevant for human consumption



SAMPLING AREAS

1. Mouth of Gromolo Torrent (Sestri Levante)
2. Mouth of Entella Torrent (Chiavari)
3. Intermediate zone



SAMPLING RESULTS

- **High levels of heavy metals** in bottom sediments due to humans activity: Cu, Cd, Ni, Zn, As, Cr, Pb, Hg



- **42 fishes** mainly from the following families: Labridae, Serranidae, Carangidae, Sparidae, Trachinidae, Mullidae, Scophtalmidae

HISTOPATOLOGY

A renewed tool to investigate the health status of the fishes

Main **tissues** involved in the response against environmental pollutants:

- Gills
- Liver
- Kidney



Tissues were fixed immediately and then observed in sections

GILL RESULTS

OBSERVED ENPOINTS:

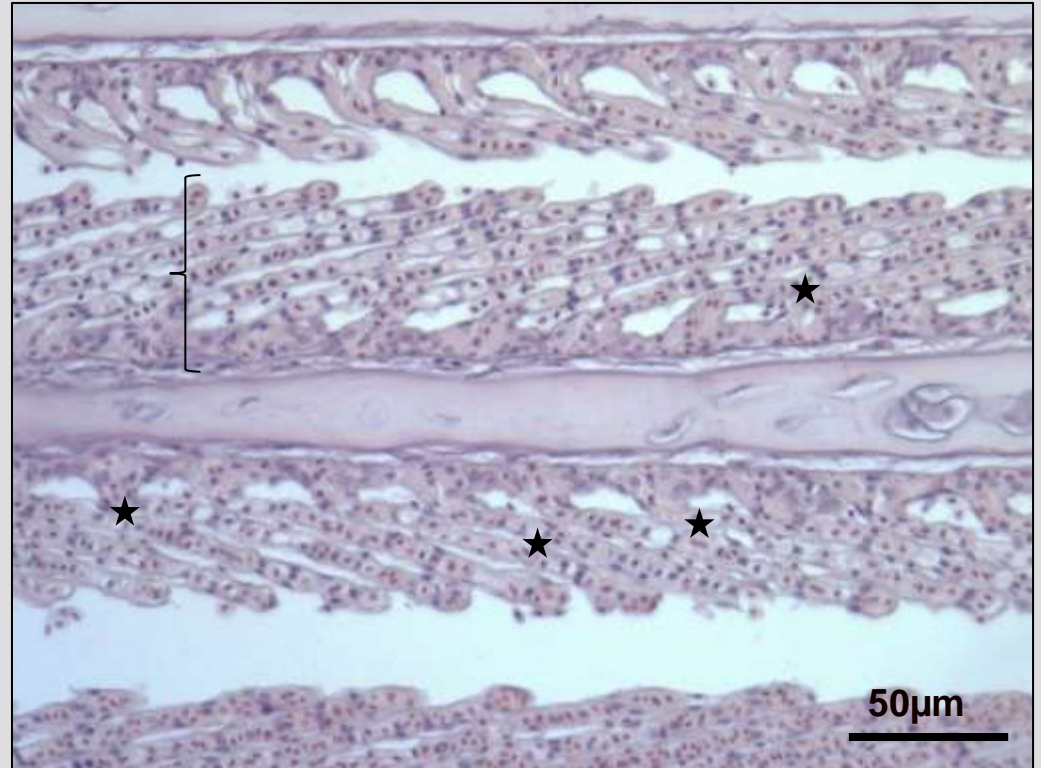
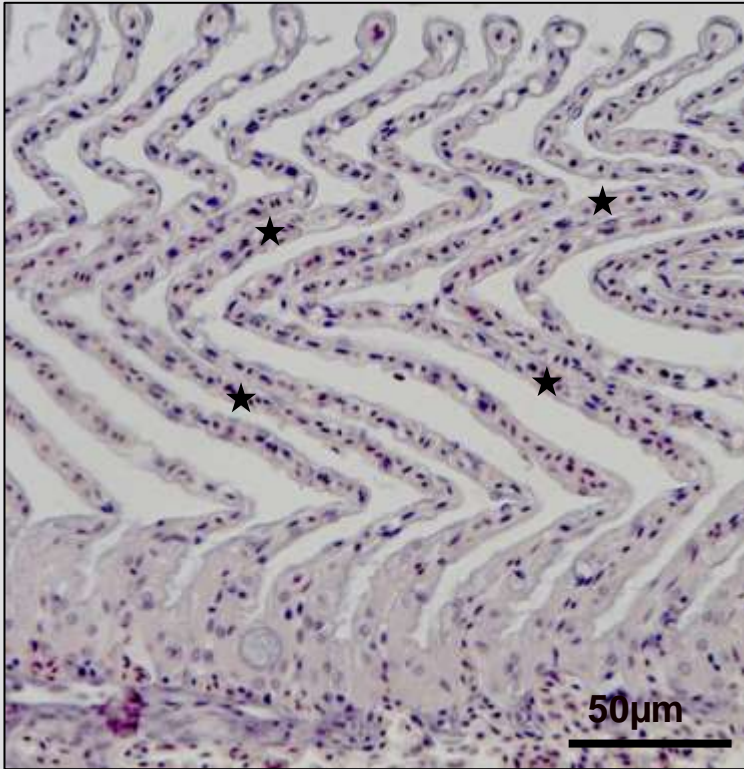
- SL Hyperplasia
- SL Hypertrophy
- SL Epithelial Lifting
- Teleangectasy
- PL Hyperplasia
- PL Hemorrhage
- Parasites
- SL Shortening
- SL Fusion
- Aneurysms
- Granulocytes Infiltration
- SL Blood Vessels Congestion

GILL RESULTS

SITE CHARACTERIZATION

Site 1- Mouth of Gromolo Torrent (Sestri Levante)

- SL Blood Vessels Congestion
- SL Shortening
- SL Fusion



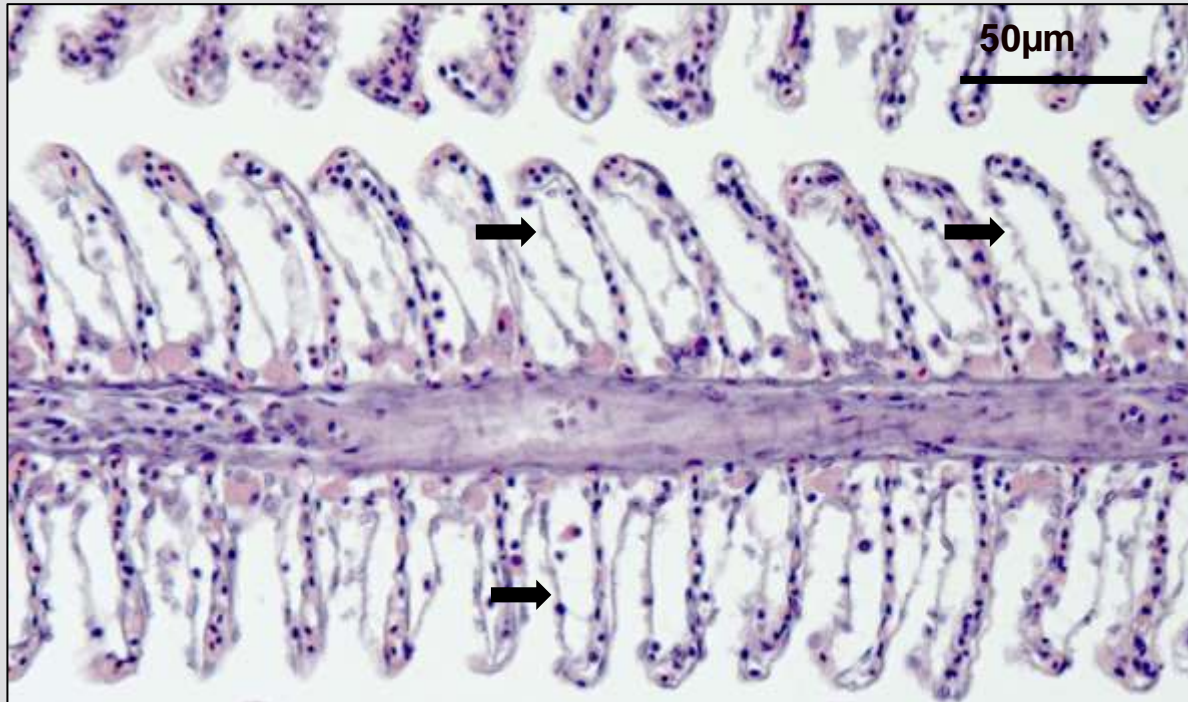
GILL RESULTS

SITE CHARACTERIZATION

**Site 2- Mouth of Entella
Torrent (Chiavari)**

Site 3- Intermediate Zone

SL Epithelial
Lifting



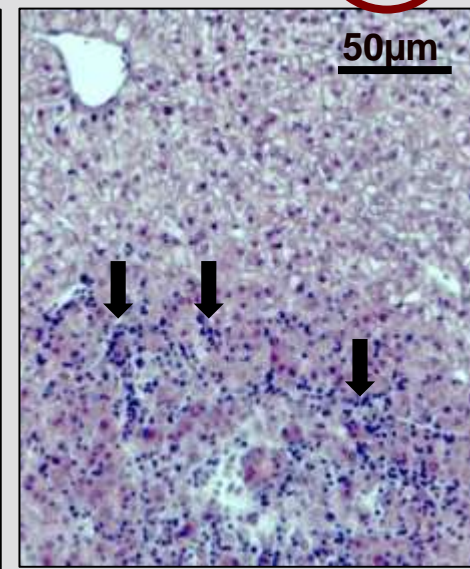
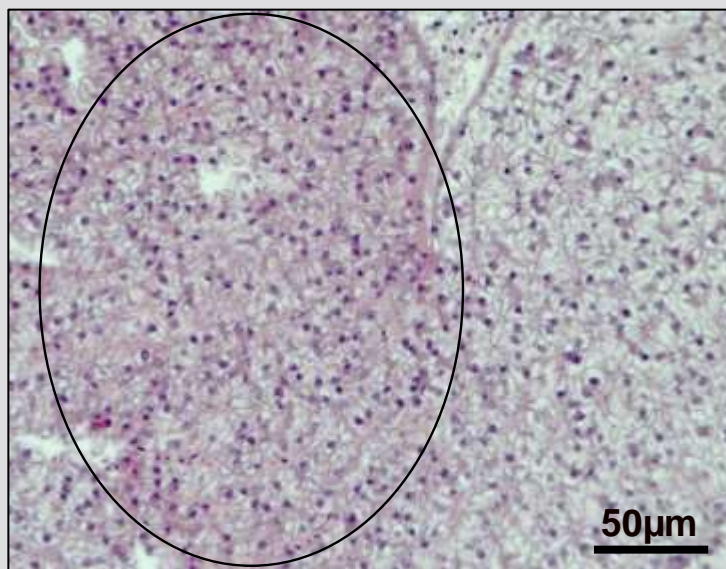
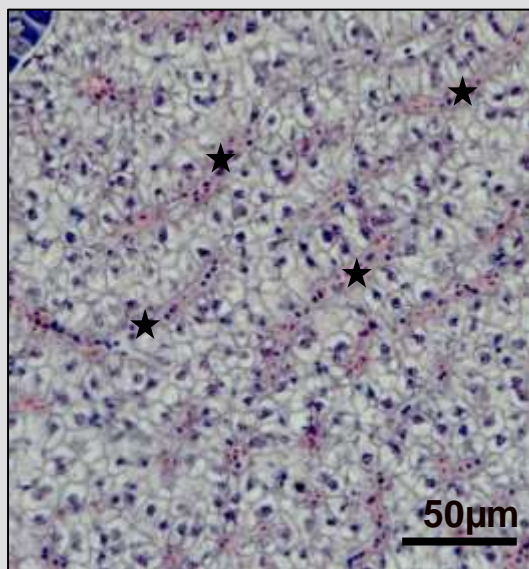
LIVER RESULTS

OBSERVED ENPOINTS:

- Lipid Accumulation
- Blood Vessels Congestion
- Loss of Cord Structure
- Hemorrhage
- Hyalinization
- Melanomacrophage Centres
- Granulocytes Infiltration
- Tissue Degeneration
- Increase in Perivascular Connective Tissue
- Cellular Swelling

LIVER RESULTS

	Loss of Cord Structure	Blood Vessels Congestion	Hemorrhage	Hyalinization	Melanomacrophage Centres	Granulocytes Infiltration	Tissue Degeneration
Site 1- Sestri Levante	91,7	33,3	25	33,3	66,7	16,7	91,7
Site 2- Chiavari	88,9	77,8	44,4	100	66,7	77,8	88,9
Site 3- Intermediate Zone	94,4	66,7	27,8	94,4	61,1	72,2	33,3



KIDNEY RESULTS

OBSERVED ENPOINTS:

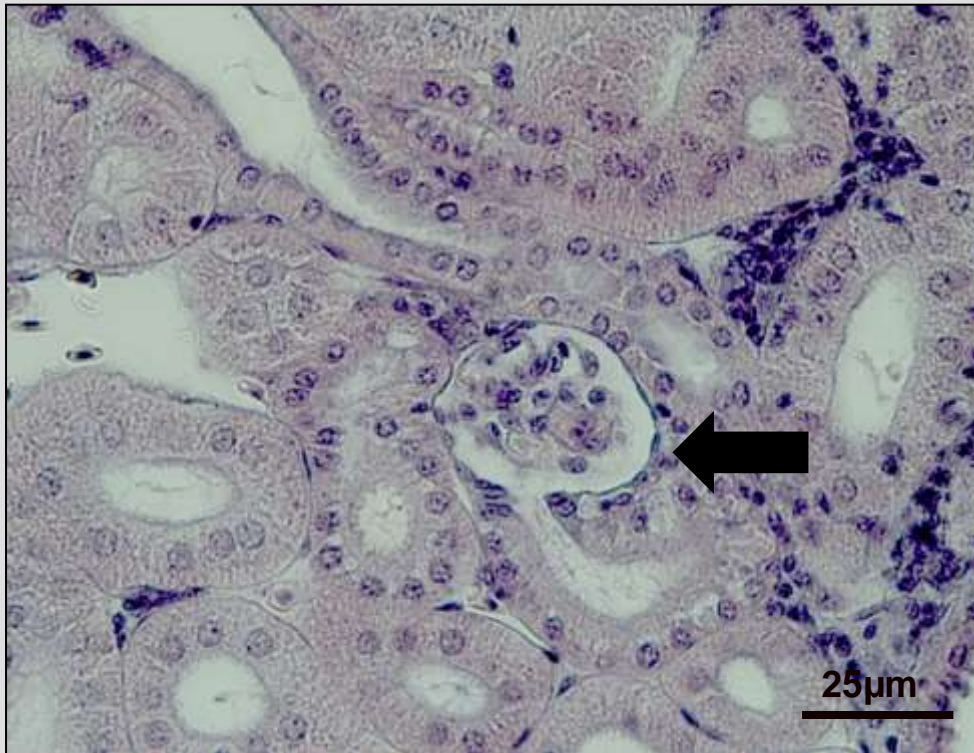
- Glomerular Necrosis
- Tubular Necrosis
- Widened Bowman's Space
- Haemorrhage
- Granulocytes Infiltration
- Melanomacrophage Centres
- Tubular Lifting from Basal Membrane

KIDNEY RESULTS

SITE CHARACTERIZATION

**Site 1- Mouth of Gromolo
Torrent (Sestri Levante)**

Widened
Bowman's Space



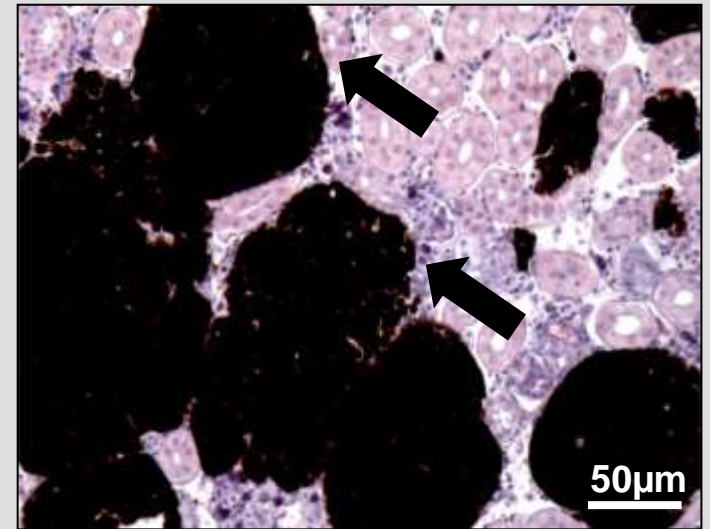
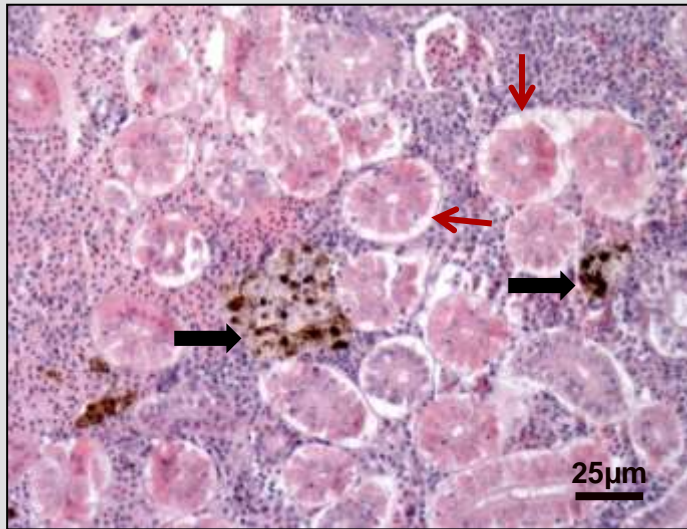
KIDNEY RESULTS

SITE CHARACTERIZATION

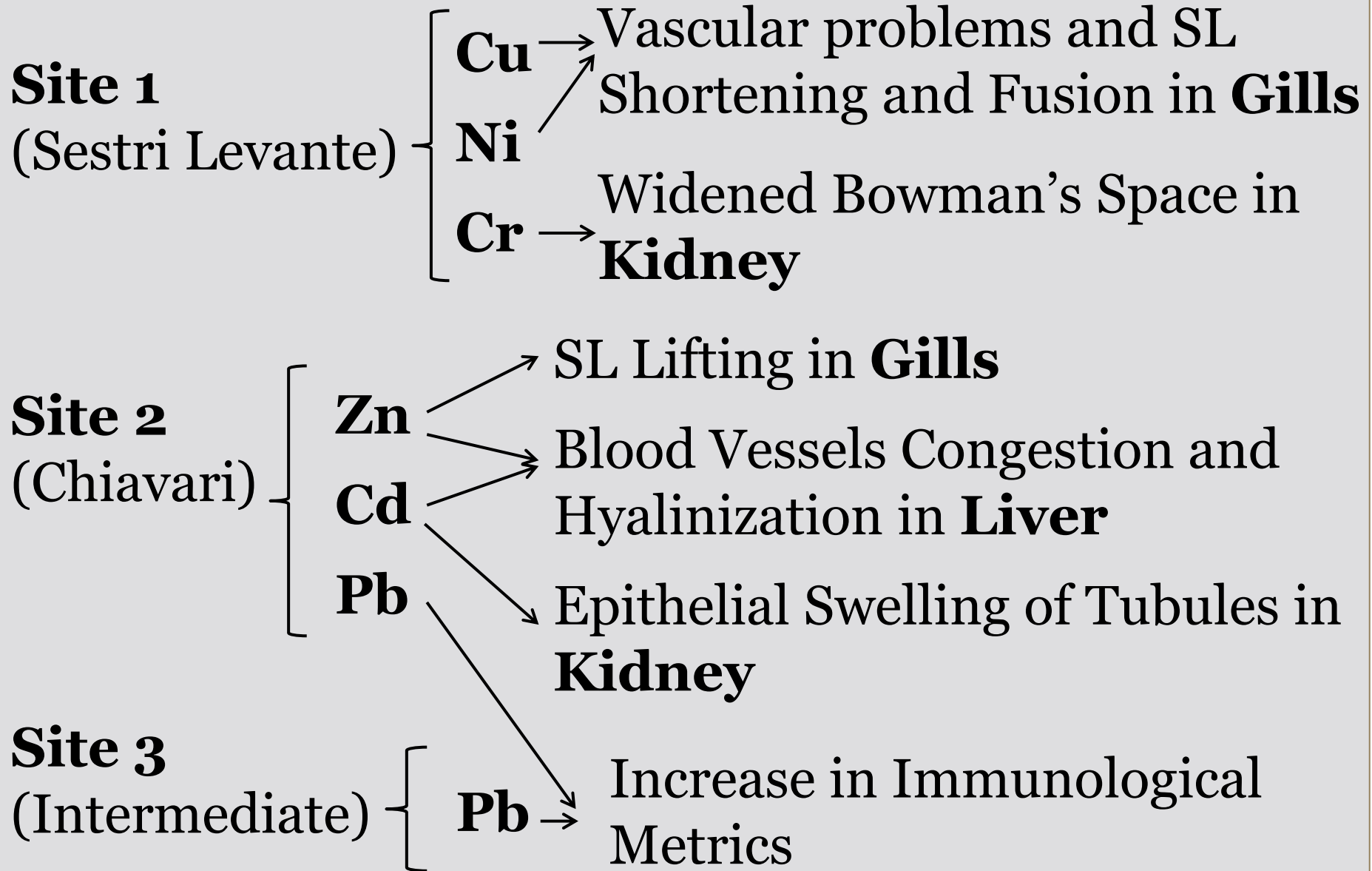
**Site 2- Mouth
of Entella
Torrent
(Chiavari)**

- Tubular Lifting
from Basal
Membrane
- Melano-
macrophage
Centres

**Site 3-
Intermediate
Zone**



CONCLUSIONS



CONCLUSIONS

SITE 2 – MOUTH OF ENTELLA TORRENT
(CHIAVARI)



MOST DAMAGED AREA ... heavy metals and more!



**HOW TO INCREASE THE
STRENGTH OF THE STUDY**

- More seasons
- Bigger Sample size
- Same species

THANK YOU!

