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Physiological and proteomic responses of a mediterranean strain of the marine toxic invasive dinoflagellate *Alexandrium catenella* exposed to a polymetallic stress

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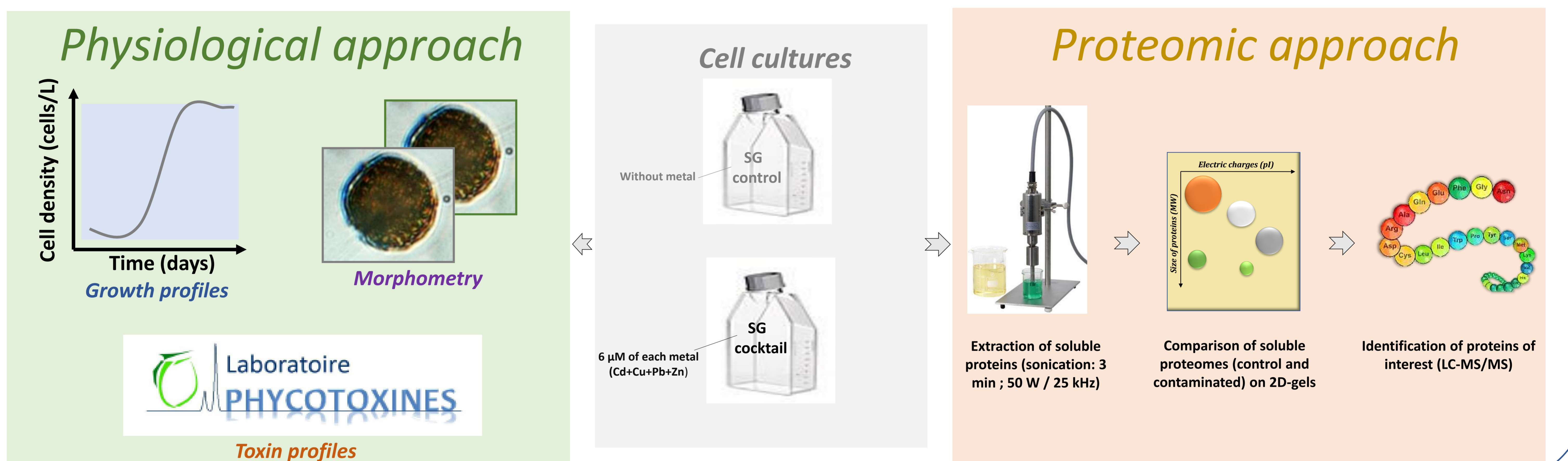
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INTRODUCTION

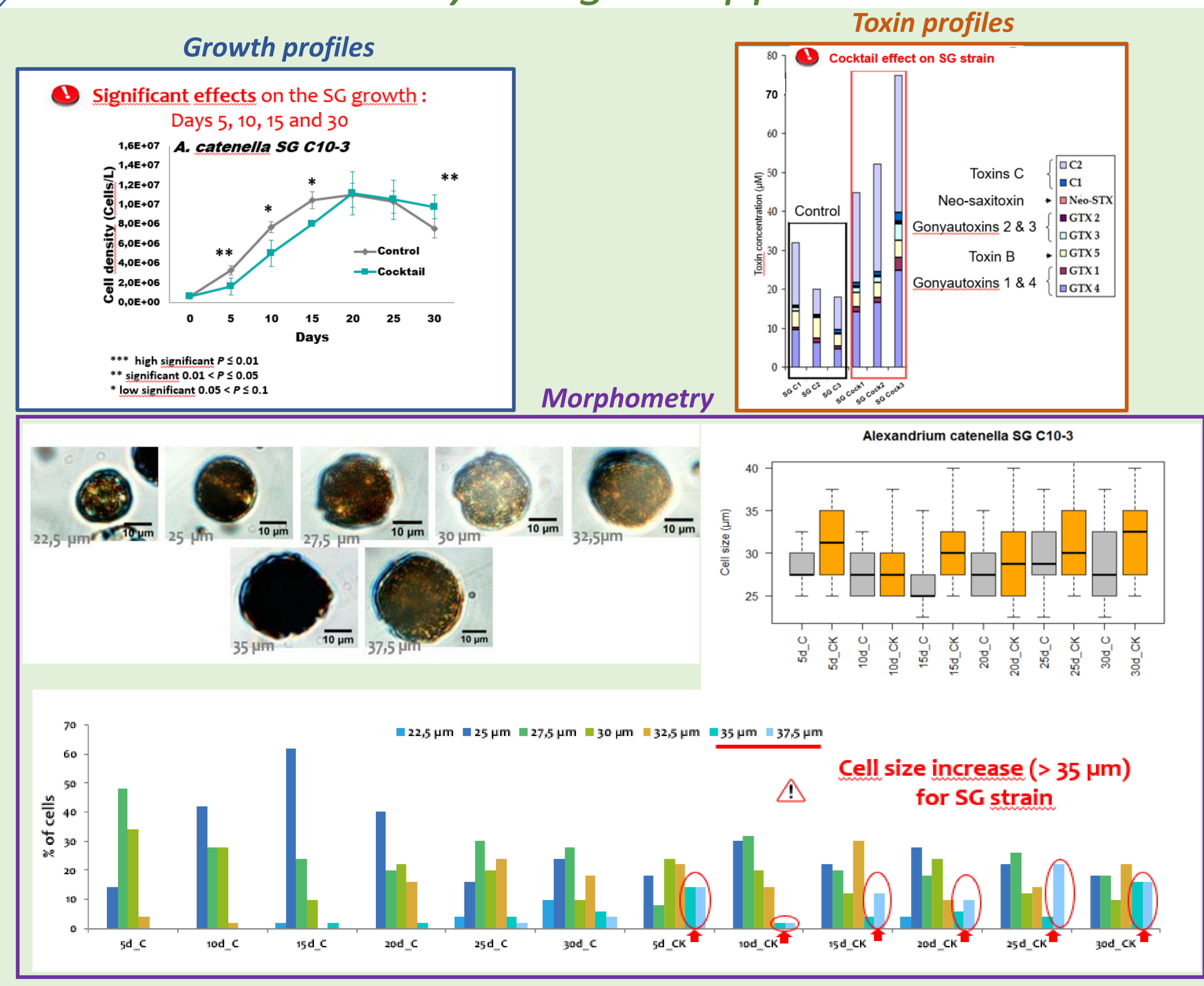
Harmful Algal Blooms (HABs) are increasingly observed in marine coastal ecosystems submitted to anthropogenic inputs. HABs may involve invasive dinoflagellates producing phycotoxins, such as *Alexandrium catenella*, responsible for the Paralytic Shellfish Poisoning (PSP) syndrome in humans after consumption of contaminated shellfishes. HAB dinoflagellates could be tolerant towards metallic contaminants, as suggested by their proliferation in some metal perturbed ecosystems. Generally, organisms acclimate to environmental changes thanks to modulation of their proteomes (total expressed proteins). The main objective of the present **ecotoxicoproteomic study** is to characterize the **proteomic response** of the mediterranean strain *A. catenella* SG C10-3 (coming from the Santa Giusta Lagoon, Western Sardinia, Italy) exposed to a polymetallic stress (Cd + Cu + Pb + Zn), in order to investigate its possible adaptation/resistance mechanisms in cocktail metallic contaminated conditions.

MATERIAL AND METHODS

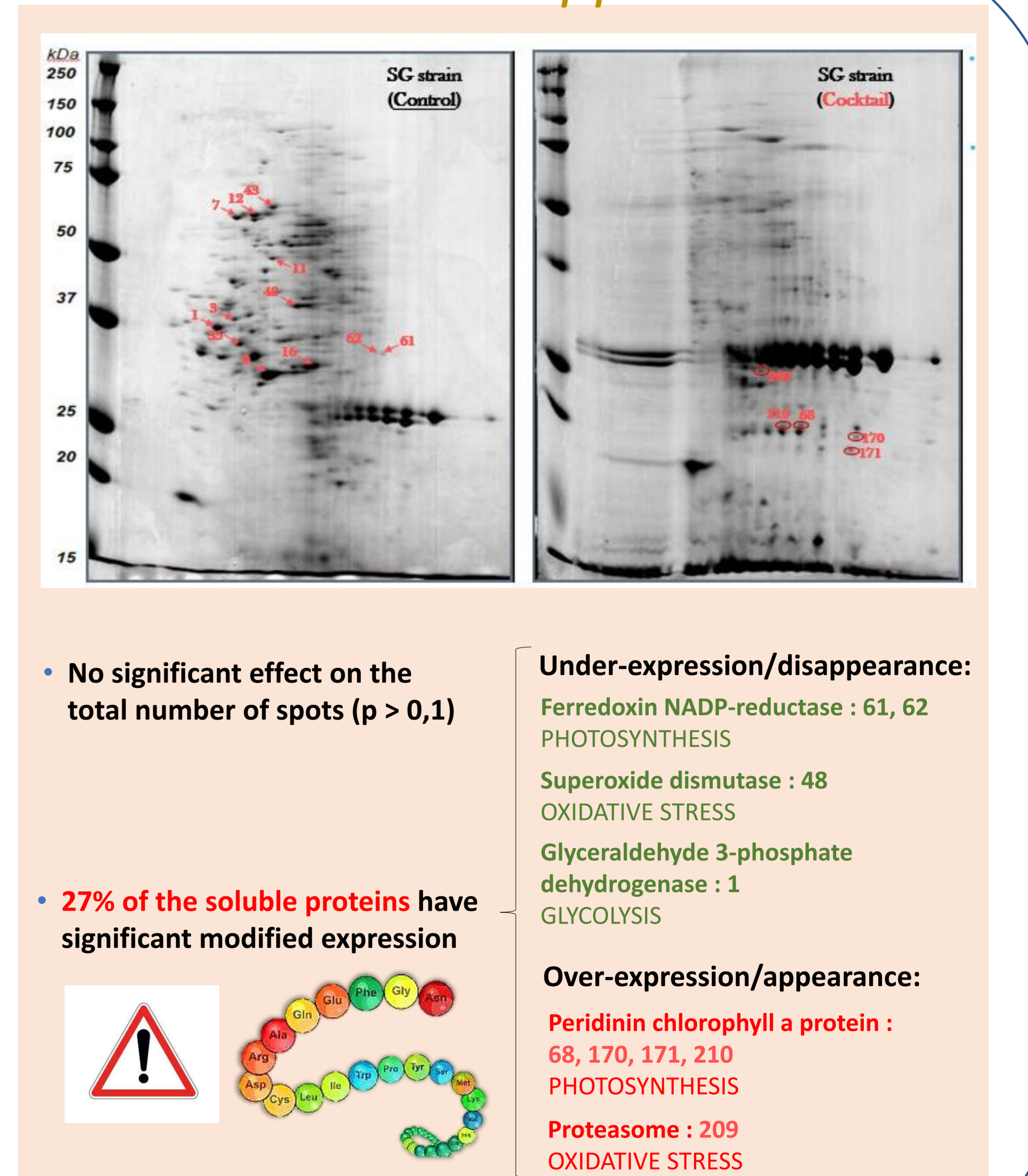


RESULTS

Physiological approach



Proteomic approach



DISCUSSION

- Significant physiological effects of the polymetallic stress on *A. catenella*: decrease in cell growth and increase in cell size suggest an **inhibition of cell division by metals**.
- Significant effects of the polymetallic stress on the *A. catenella* toxin production: **stimulated production of saxitoxin derivatives (toxins C and gonyautoxins)**.
- Significant effects of the polymetallic stress on the *A. catenella* soluble proteome: **many metabolic pathways** are affected (*photosynthesis, oxidative stress, glycolysis*).
- Proteins of interest can be used as **biomarkers** of the *A. catenella* proliferation in metal contaminated ecosystems.