NOS ACTIVITY IN THE SEA ANEMONE FOLLOWING LIGHT-INDUCED STRESS

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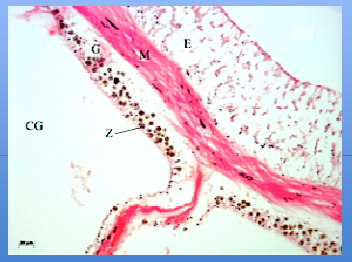
INTRODUCTION

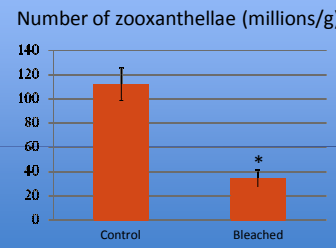
Intense light induces bleaching, the expulsion of symbiotic algae, in hermatypic cnidarians such as corals and anemones. Among several mechanisms proposed to explain bleaching, oxidative stress along with the production of nitric oxide (NO) is often pointed out. In the present study we determined the spatial distribution of NO synthase (NOS, enzyme producing NO) and examined the role of NO following light-induced stress in *Anemonia manjano*.

BLEACHING

Expulsion of approximately 70% of zooxanthellae was obtained by maintaining anemones at 4°C in darkness during 4h.

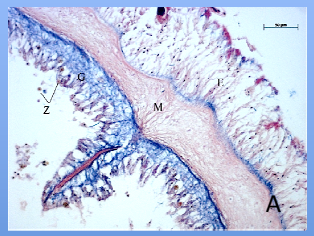


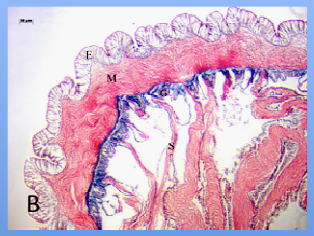
Healthy anemone : E, endoderm ; G, gastroderm ; GC, gastric cavity M, mesoglea ; S, septa ; Z, zooxanthellae

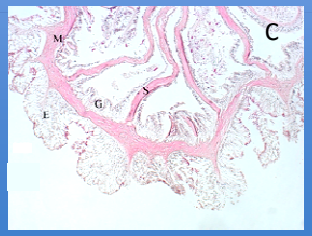


LOCALISATION OF NOS ACTIVITY

NADPH-diaphorase staining was used to detect NOS activity on parafin sections of healthy and bleached anemones. After bleaching, anemones were either maintained in darkness or returned to normal ligthing. conditions. (E, endoderm ; G, gastroderm ; M, mesoglea ; S, septa ; Z, zooxanthellae)





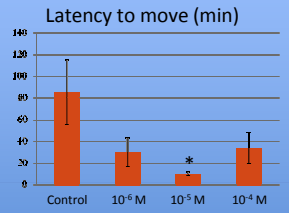


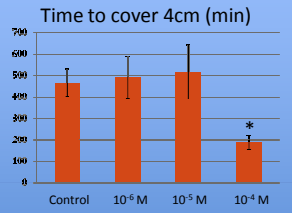
In healthy (A) and bleached (B) anemones, NOS is localised in the entire thickness of the gastrodermal layer and at the basal part of the ectoderm. No NOS activity is detected in bleached anemones kept in darkness (C).

NITRIC OXIDE ROLE IN MOVEMENT

Both NO donor (sodium nitroprusside, SNP) and NOS inhibitor (N-methyl-L-arginine, LNMA) were used to determine the rôle of NO in movement. Latency to move and time to cover a predetermined distance in response to a intense light exposure (≈ 350 µmol photons/m².s) were measured.

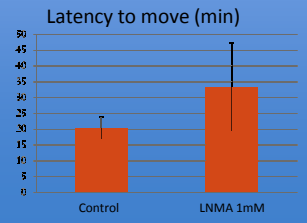
SNP

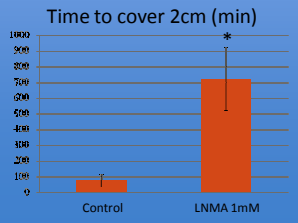




All concentrations of SNP induce a reduction of latency time while only 10^{-4} M is able to increase pace. (*) $p < 0,05$

LNMA





LNMA increase significatively the pace but fails to reduce latency time. (*) $p < 0,05$

CONCLUSION

In healthy and bleached anemones, localization of NOS activity in regions that are known to be enriched in contractile filaments suggests a possible relationship between NOS activity and cytoskeletal functions. In bleached anemones maintained in darkness, NOS activity was barely detectable, confirming a role of light and thus probably symbiotic algae in regulating NOS activity. Concerning avoidance to light exposure, results suggest that NO is involved in regulating the motion of *Anemonia manjano*.

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