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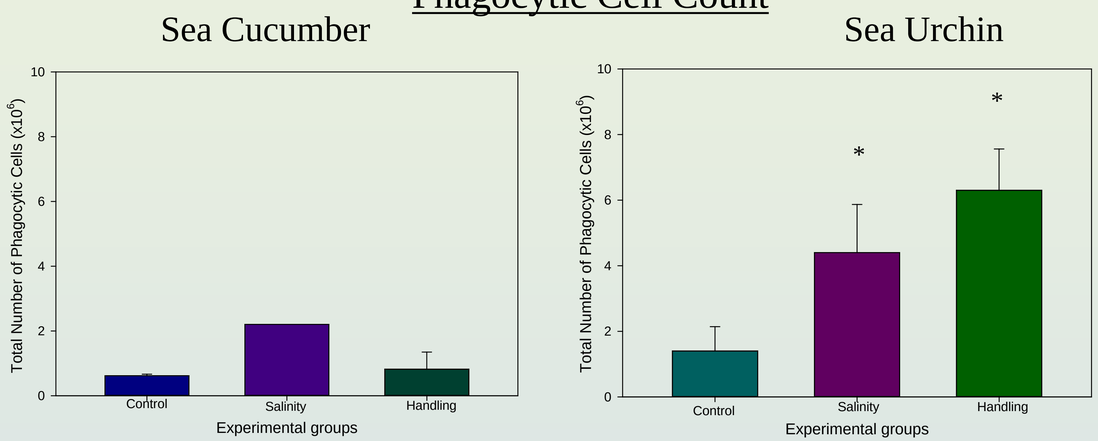
Echinoderms such as sea urchins and sea cucumbers are important both as a source of food and a source of pharmaceuticals. In the United States, there is currently no aquaculture of the purple sea urchin and the giant California sea cucumber. A species that is a viable candidate for aquaculture should be resistant to the stresses that are inherent to an aquaculture environment. This study compares some immunological and physiological results obtained from the purple sea urchin, *Stronglyocentrotus purpuratus*, and the giant California sea cucumber, *Parastichopus californicus,* kept in low salinity or handled.

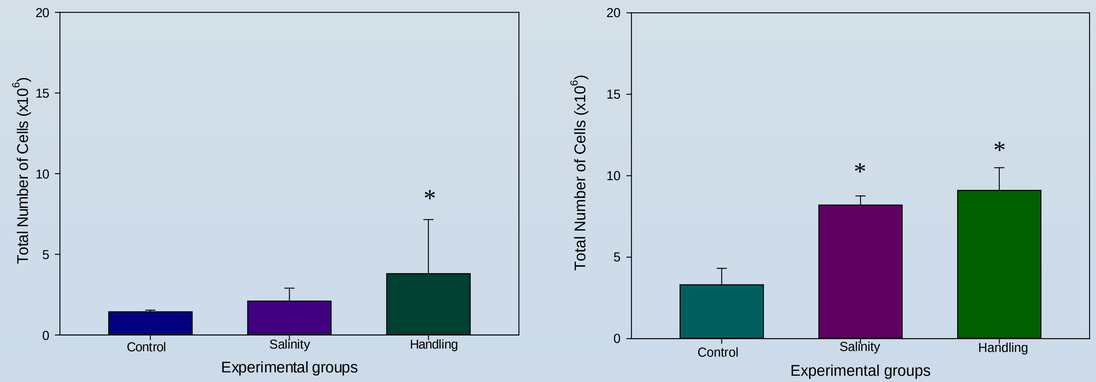
Phagocytic Cell Count



Phagocytic cells will increase in response to any general stress, and are the major effectors of cellular immunity in echinoderms. In sea cucumbers there is no significant increase in phagocytic cells, but in sea urchins there is a significant increase. The increase of this cell type would indicate that the sea urchins kept in low salinity and those that are handled experience stress, whereas sea cucumbers do not.

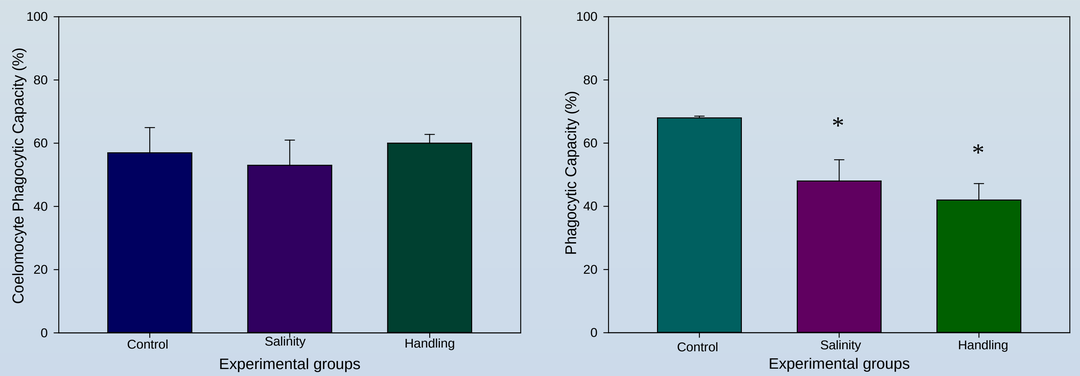
Based on the results obtained, it appears that giant California sea cucumbers are much less susceptible to salinity and handling stress than are purple sea urchins. Animals that are resistant to stress tend to be better candidates for aquaculture, and as this species of sea cucumber is highly valued in the Asian market, it would appear to be a good candidate for active culturing. The purple sea urchin is also considered a delicacy, but no successful commercial aquaculture facilities have been established. Since both salinity fluctuations and handling occur in intensive aquaculture systems, these results could give the reason for this lack of success.

Total Coelomocyte Count



The total coelomocyte count shows a significant increase ($P < 0.05$) in low salinity and handling in the sea urchins, and a significant difference in handling for the sea cucumbers. In invertebrates, animals that are stressed with have increase in total cell number in order to maintain homeostasis and compensate demands caused by the stress.

Phagocytic Capacity



Phagocytic capacity is a measure of the phagocytic cells ability to phagocytize foreign particles or bacteria. When an organism is stressed, the phagocytic capacity decreases, making it more susceptible to disease. In sea cumbers, there is no significant difference across groups, as there was for sea urchins.