WOUND HEALING IN CARIBBEAN SPONGES

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ABSTRACT

On Caribbean coral reefs, many sponges produce chemical defenses that deter fish predation. Sponge species that constitute most of the diet of sponge-eating fishes lack chemical defenses and live exposed on the reef. It has been hypothesized that these chemically undefended species may compensate for fish grazing by growing faster or rapidly healing wounds. Wound healing experiments were conducted to determine if differences exist in the healing rates of chemically defended and undefended species of tubular and vase-shaped sponges. Experiments were conducted on patch reefs in the Florida Keys and the Bahamas in 2002. A scalpel was used to cut circular holes in each sponge approximately 2 cm^2 in area and 3 cm from the lip of the sponge. Photographs of each wound were taken after the wound was cut and 12 days later. Photographs of the wounds of several individuals of each sponge species were taken on multiple days during the experiment. A digitizing software program was used to measure the area of wound healing. Healing rates were significantly faster during the first few days of the experiment, with rates leveling off after the third day. Undefended sponges healed wounds at significantly faster rates than sponges with chemical defenses. Undefended sponges were *Callyspongia plicifera* (8% wound area regenerated per day), *Callyspongia vaginalis* (6%), *Niphates digitalis* (6%), and *Xestospongia muta* (6.5%). Chemically defended sponges were *Cribrochalina vasculum* (2%), *Ircinia campana* (2%), and *Verongula gigantea* (0%). Orientation of wounds relative to the tidal current had no influence on healing rates. *Niphates digitalis* individuals growing in tubular form had faster healing rates than individuals with vasiform shapes. This study suggests that

Caribbean reef sponges may have followed two different evolutionary trajectories with regard to fish predation: chemically defended species deter predation and have slow healing rates, while chemically undefended species allocate resources to rapid wound healing in response to frequent grazing.

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