

S. Kotelnikova, Nicholas Caputo, "Novel Antibiotics Producing Microorganisms from Tropical Marine Surfaces," GSP-SRGI-05001 - 21 February 2005-Feb 2006

Over the centuries man has looked to nature for curative organics, from the ancient Egyptians who used aloe from plants to treat dry skin to the scientists of today who extract compounds such as cephalosporins from marine life to use as antibiotics. The latter compounds have been proven time and again in their usefulness against infections. However, bacterial resistance to contemporary antibiotics is rising at alarming rate. This project sought to answer: 1) whether or not there are novel microorganisms inhabiting the biofilms on sea rocks sampled from coastal floors around the tropical island of Grenada and 2) whether those novel microorganisms produce antimicrobial compounds. The central hypothesis was that there must be new species of bacteria producing antimicrobial substances waiting to be discovered. Samples (of what?) were collected off the shores of Grenada at five locations and cultured in reduced salinity artificial sea water agar (salinity=36 ppt?) at the microbiology labs at St. George's University. 141 isolates were initially screened via a modified Kirby-Bauer assay. Of these isolates, 15 (~11%) were found to have antimicrobial activity. Eight of which met a set of criteria compared to the positive control, Penicillin. Data collected on these eight were then subjected to a paired t-Test with 5% α level and six of these isolates were found to significantly inhibit one or more of the pathogens ($p < 0.05$). Those that were shown to produce active antimicrobials were characterized by physiology and biochemistry through the use of API 20NE, API Staph and API Strep test strips. Strains TB 4-32, TB 5-22, DB 9-33, PB 4-31, PB 5-21, and PB 7-11 were characterized morphologically and biochemically. They were identified to be different species most closely related to genus of *Marinococcus*. This data suggests that aquatic marine biofilms are appropriate environments for searching for new forms of life and organisms producing unique antagonistic biological compounds. Taxonomic affiliation of the active isolates indicates that the secondary metabolites antagonistic to known pathogens may represent new and effective antibiotics.