Profile of Dr. Russell Hill

Fortunately, Dr. Russell Hill loves to travel and spend time at sea, because both can be all in a day’s work in his job as an associate professor at the University of Maryland’s Center of Marine Biotechnology. Hill studies marine microbial ecology and is particularly interested in marine bacteria that may be the source of new bioactive compounds, such as antibiotics and anticancer agents. One of the groups of bacteria he studies, the actinomycetes, is the source of more than two-thirds of naturally occurring antibiotics. He has chased down novel actinomycetes as close to his home as the Chesapeake Bay, and as far off as the nearshore waters of Hawaii and at deep-ocean hydrothermal vents. In addition to their potential use as a source of antibiotics and antivirals, another property of some marine actinomycetes that fascinates Hill is their resistance to the effects of some toxic metals such as mercury. This property may lead to the development of methods to remediate metal-contaminated soils, waters, and industrial waste.

After receiving undergraduate and graduate degrees in microbiology in his native South Africa, Hill applied his knowledge to the marine environment when he joined the lab of Dr. Rita Colwell at the Center of Marine Biotechnology, University of Maryland Biotechnology Institute. One of his favorite things about the research he does is that he has had the opportunity to dive in three research submarines: the RSV Alvin, the Johnson-Sea-Link and the Japanese Shinkai 2000. When grueling grant writing and budget work, his least favorite parts of his job, don’t prevent it, he loves working in the lab, and as he puts it, “playing with my bacteria.”

He is eager to conduct work that will protect and conserve the marine environment he loves so much. In addition to the bioremediation applications of some of his work, he may indirectly be finding ways to prevent the overharvesting of some marine invertebrates. It turns out that some bioactive compounds that have been isolated from marine invertebrates such as sponges may actually come from bacteria associated with the invertebrate. If the bacteria themselves can be isolated and cultured, the compounds may be able to be produced without harvesting the sponges from the environment. In one such study, Hill’s lab is characterizing the microbiology of several sponge species from Indonesia, the Florida Keys and the Red Sea, using biotechnological techniques to sequence RNA genes of some unusual bacteria associated with the sponges. Once his students know what bacteria are actually present in the sponges, they can try new tricks to grow them in the laboratory, and they can be screened to see if they produce any novel compounds that may be useful as drugs.

In addition to the fun he has at work, Hill enjoys working on old cars (he has a 50-year-old Land Rover), sailing, and photography. Asked what advice he would give a high school student who wants to pursue a career like his, he said “Develop a strong academic background, and work in many different areas of biology while you are in high school and college. Internships are really important and helpful in selecting your career focus. Many researchers will take on volunteers over the summer and this is a great way to get experience and find out which aspects of marine biology are the most enjoyable for you.”