From Hot Springs and Sulfur to Iron and Belly Buttons: A Quest for Novel Antibiotics

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One of the greatest challenges in medicine right now is having enough new antibiotics to combat bacterial infections since antibiotic resistance contributes to 5 million deaths worldwide yearly (since 2019). If nothing is done, by 2050, this could escalate to 10 million deaths per year, equal to the number of people dying from cancer each year now. Still, most people are unaware of how dire this problem is and that searching for new antibiotics should be a top priority. In this project, resistance of 8 antibiotics was tested in bacteria from lettuce. A correlation between year of discovery of each antibiotic and zones of inhibition (Kirby-Bauer test) was established ($R2=0.69$, $p<0.00001$). The older antibiotics had smaller zones which indicated that over time antibiotics lose their potency. Additionally, though belly button bacteria were less resistant to 12 antibiotics compared to those on store-bought produce, 35% still had some resistance. In response to these troubling findings, new antibiotics were sought from different environments, one extreme (hot springs) and one diverse (belly button). In addition, a newly synthesized iron (II) compound was also tested. Sterile disks were soaked in 16 filter sterilized solutions from the three sources and all experiments were done in triplicate. Small zones of inhibition were found in 78% of hot springs and 33% of belly button samples. So, the hypothesis that antibiotic activity would be found in at least one sample, was supported. Continued bold and creative approaches to finding new antibiotics are critical.

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