

JACQUIN NILES: All of my memories are growing up in a really tiny, British-dependent territory called Anguilla. To give you some perspective, it's about 35 square miles total area, 36 during low tide. People knew each other. If you didn't know them directly, you knew who their family and relatives were.

I became interested in medicine, not just from the perspective of understanding the fundamentals of how biology works in a living entity, but also the idea that it can go awry. And how do you fix it? Every year, about 700,000 or so, mostly kids under the age of five, are estimated to die from malaria.

Malaria is a parasitic disease. It's caused by this family of protozoan parasites. A mosquito becomes infected by feeding on the blood of an infected person. That blood can contain infectious forms of a parasite that develops within the mosquito, and eventually will get into the salivary glands of the mosquito, and then be transmitted back to the blood of another person who was bitten by that infected mosquito.

Within the red cell, there's an extremely high concentration of hemoglobin, which contains the co-factor heme that is responsible, largely, for the transport of oxygen in the human body. The parasite is able to degrade the majority of the hemoglobin within the red cell. The heme, it has to deal with. Because heme that is not polymerized has the ability to convert molecular oxygen into more reactive oxygen species that can be damaging to membranes, proteins, DNA, et cetera.

And so the parasite has devised a strategy for polymerizing this heme into this inert polymer called hemozoin. And that actually provides an opportunity for us, because if we can prevent the polymerization of heme, in principle, we can see the toxicity of heme reemerging. And so some of the most successful anti-malarial compounds, such as chloroquine, can actually bind heme and prevent its polymerization. And presumably, the increased amount of free heme that is produced then kills the parasite.

Why I don't practice medicine currently, I think that's just been a really valuable perspective and a framework for me to think about what I do in the long term, and how that can translate into some impact on human life.