

## Findings

by Sheila Cowley  
inspired by the work of Dr. Mya Breitbart  
at the USF College of Marine Science

[January 19, 2024 Draft]

There is so much we don't know.

Isn't that just wonderful?

Astronomers get all excited every time they catch a glimpse of some big gorgeous nebula, like they're finding seashells on the beach.

They love every glimpse of light – 'cause the universe is just so big, enormous, dark and empty.

And I get that, 'cause the ocean is a big, enormous, dark and empty place, right here. Every dolphin, every fish – they're like a star, that's light years from the next one.

But when you look closer – like at viruses, my specialty – the ocean's just jam-packed with them. I look in my microscope and it's a circus.

But to tiny viruses? – it's like the dolphins. They feel like they're miles apart.

'Cause the sea's so big, and dark. So when you can find each other, you glom on. You hang onto each other for dear life.

What I love about this job, is you can't plan for what comes next. My next urgent, crucial project usually is a big surprise.

But I love surprises.

And I love this cool ceramic sea urchin – so great, right? He's been on my desk forever. 'Cause it's harder than you'd think to find a cute ceramic nanoparticle!

So it was a cool surprise when I got asked to find out why these beautiful, these long-spined sea urchins, why they were dying.

They're called Diadema [“DAI-uh-DEE-muh”] – gorgeous. Look at that. So delicate, and rare.

Rare 'cause almost all of them – 90% – suddenly just died off, in the '80s. We still don't know why.

Over the last 40 years, 12% of them came back. 12%. It's not a lot. But for them, a miracle.

But we don't know why that happened, either.

Just look at those lovely spaced-out spines. So elegant, and graceful.

See that little round red circle, with – okay, like lips? Well, that's their butt.

And here, take a look at this. I took this picture on my phone, and when you zoom way in, you see those iridescent blue dots? That, is on their genitals. Can you believe it? Decoration!

I mean, hey, next Halloween? I am coming as a Diadema.

See those white dots? That's how they sense light, and dark. You can wave your hand, they feel the shadow as you block the light out – and they wave back. They wave back.

So I say hello each morning. We wave at each other. Hi.

There's a stretch of ocean, from Florida's east coast to the Caribbean. And the term we use for it right now is – urchin graveyard.

I can go there, take an urchin, put it in my nice safe lab and take such tender care of it. But in days its spines start dropping off – it's horrible. That is how they move, they live.

I can wave – they can't wave back.

And in a week, they die.

And nobody knew why that was happening – 'til now!

We discovered why, here in my lab. I think it's a scientific record – it is utterly amazing that we figured out what's causing this, within a year. A year!

I mean, we've been working on coral diseases for decades.

Science, is a process, right? Every 'how' – and every tiny 'why' – hey, that's a victory.

We found out – right in this lab – that it was this guy. A single-celled ciliate ["SIH-lee-uht"]. Look close. You see the – well, it looks like, fur? Around the edges? That's how they move. Kind of beautiful, just on his own.

But the sea is big. And dark. And when you find another somebody you just glom on, right? And you hang on for dear life.

Just look – that spine fell off an urchin that died so sadly in my lab. It's inundated. Ciliates still swarming over it.

I mean, I'm a scientist. But that gives me heebie jeebies.

So just finding this guy – knowing what is causing this epidemic, that's amazing. I can barely sleep, my brain is humming on high speed, it's sparking.

Because now, the question is – how can we fix it?

I think we will find a cure. But then there's another question – how can we deploy it? It's not like these little guys just line up at the clinic for their shots.

How do we dose them without killing everything around them?

That's a question covid folk don't have to deal with.

But what a thrilling question.

Scientific breakthroughs only happen fast in superhero movies. I know because my granddaughter described to me, in great detail, six scientific breakthrough scenes from superhero movies just last night.

Hey, that gives me confidence that she will have that kind of passion – and that memory for detail – when she's working hard on Mars. Or standing in the prow of an old research ship – exploring the same seas that I do.

And they'll still be full of mystery.

I am mystified by how my friend crocheted this hat! I asked her to make an urchin hat for me when I gave a big talk on our findings – 'cause I needed everyone to pay attention.

This is her idea of a sea urchin. Artists, right?

Let me tell you, it got everyone's attention.

'Cause scientists, we love to talk about our work! But the only people who really understand my work have PhDs in cell biology. Or, they're in kindergarten. I talked to my granddaughter's class and hey, they got it.

Partly 'cause I wore this hat.

And 'cause I made cookies shaped like urchins. And the live ones all have google eyes. And the dead ones all have X's.

They could see right then and there why this is so important. And they ate those cookies up, did a little urchin dance – not completely accurate, but hey. And then they all drew pictures. Mostly of me in my hat.

And when I left her class, I waved – and they waved back.

And you know, that makes me wonder – could we make a cookie that sick urchins can eat, and they'd feel better? I don't know.

But what a thrilling question.

There is so much we don't know.

But we're working on it.