# Video Transcript: 2024-25 Premier’s Awards for Health and Medical Research Dr Charles Bayly-Jones

## Dr Charles Bayly-Jones

My name is Dr Charles Bayly-Jones. I’m an Australian Research Council DECRA Fellow and Post-Doctoral Researcher. I’m based at the Monash Biomedicine Discovery Institute where my research falls under the cancer program.

Text: 2024-25 Premier’s Awards for Health and Medical Research. Celebrating the achievements of Victoria’s early career health and medical researchers. Dr Charles Bayly-Jones. Basic Science Researcher Award. Victoria State Government. 30th Anniversary. Supported by ASMR, Australian Society for Medical Research.

Text: Why did you become a health or medical researcher?

## Dr Charles Bayly-Jones

I’ve always been passionate about science ever since I was a kid. I was one of those kids that pulled apart their toys at Christmas and even my dad’s ride-on mower at one stage.

Vision: View of the Monash Biomedicine Discovery Institute.

## Dr Charles Bayly-Jones

It’s kind of how my mind works. I like to understand how things work. I think one of the defining features of my career that really solidified why I wanted to be a researcher was that moment that all scientists experience, which is that thrill of discovery, when you look down a microscope and you are the very first person to see a secret of nature, just uncover a hidden secret that’s been concealed for possibly thousands of years. And, when that happened for me the first time I was hooked.

Text: Please introduce your nominated research project. What problem is it addressing?

Vision: View of Charles in the laboratory.

## Dr Charles Bayly-Jones

So my project was called Deciphering the Pathways and the Molecular Machinery that Governs Cell Growth. It’s around this cholesterol sensor called LYCHOS, so it’s cell growth pathways and how cells respond to central nutrients. But up until now we’ve not really had any insight into how LYCHOS is able to switch cell growth on in response to cholesterol and how it switches cell growth off.

Vision: View of Charles in the laboratory and walking through the building.

## Dr Charles Bayly-Jones

So we used a combination of advance technologies, supercomputing, and a type of imaging technology called crowd electron microscopy, and we essentially generated many thousands of images, terabytes worth of data where we were imaging LYCHOS imaging this cholesterol sensor.

Vision: View of Charles working on LYCHOS at the computer.

## Dr Charles Bayly-Jones

And then we used this information to reconstruct a three-dimensional snapshot of the structure of LYCHOS, what it looks like in three-dimensions. And this is like zooming right in to the smallest possible scale of molecules within our cells.

Text: What have been the project’s results?

## Dr Charles Bayly-Jones

We made a couple of discoveries. The first one was that LYCHOS is this really unique architecture. It’s a combination of other machines that the cell uses that scientists are familiar with, but nature’s put them together in this new way and it’s repurposed it. So that was the first time that any of us had seen this kind of architecture before, it’s quite unique.

Text: How could this project make a difference to people’s lives?

## Dr Charles Bayly-Jones

So, cholesterol’s a really essential component of our cells. All of our cells have this barrier that we call the membrane, it’s like the skin of the cell. And one of its core components is cholesterol, so you need cholesterol in your diet.

Vision: View of Charles working in the laboratory.

## Dr Charles Bayly-Jones

So, having a balance where your cells grow in response to cholesterol, but not too much, is really important. Too much cell growth is associated with things like cancer, metabolic disorders, and too little growth would mean we’re not healing properly or we’re not developing or growing normally.

Vision: View of Charles working in the laboratory.

## Dr Charles Bayly-Jones

So, today we’re one step closer to understanding the molecular processes that govern that, and that means we’re now one step closer to being able to intervene and maybe modulate or fine tune the processes for therapeutic potential.

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