

JO ST BAKER AND AMY DOWDLE

Awakening



Figure 1. Jo St Baker, Animated 1.49 min film loop projection on *Awakening (All for Love)*, 2017, chiffon print scarf.

AMY DOWDLE

Ever since I was a child, I have loved classic eighties coming-of-age movies, and my favourite was always *Ferris Bueller's Day Off*. American movies in particular have this tendency to romanticise those teenage years: my adolescence was certainly more bumbling and pimply than these films had led me to expect. In reality, many of us would struggle to identify our own “coming-of-age” moment – but in fact, genetically speaking, we all had a coming-of-age before we were even born. Following fertilisation, the early embryo is developing according to instructions left in the egg by the mother. The cells are growing and dividing, but the embryo's own genes are silent – they're switched off. So development is being maternally directed, much in the same way our childhoods are. However, at a certain point, the embryo's genes wake up; they switch on and become active. Not only does the embryo begin to print its own developmental instructions, but it also shuts down the maternal factors that are still present in the cells. This is equivalent to the teenage rebellion of the embryo, where it begins to take over fundamental processes for itself and disregards that parental guidance. But what flicks that switch? There are a few hypotheses in the field, but as yet none are sufficient to explain what triggers this activation of the embryonic genome.

Let's change gears for just one second and talk about DNA. Geneticists love to mention that every cell in your body contains two metres of DNA, but how does it fit? Imagine you have two metres of wool – what is the most efficient way to store it so that you can still use it, without it tangling? Rolling it into a ball, of course. And in much the same way, this is how your DNA is packed into your cells. The way that it is rolled up is really important for its function, because when two sections of DNA interact that can affect the expression of different genes.

So back to fertilisation – you have two separate sets of DNA coming together, jostling about and cooperating to form one whole new organism. We think that once the genome is ready and has folded up into the right shape, genes can be expressed and therefore the embryo can take control of its own fate.

My research aims to look at the shape of DNA both before and after it becomes active, to see how and where it changes, and how this affects its function. Not only will this reveal insights into a fundamental biological process, but it may also help us to fill in some gaps around the mysteries of infertility and certain human diseases. This project is asking a big, basic question about the origins our independence, but as Ferris once said, “Life moves pretty fast. If you don't stop and look around once in a while, you could miss it.”

Jo and I both interpreted this switch as an analogy for flowering, blossoming or transforming into an awakened state, likened to that of a child transitioning to adulthood. The painting *All for Love* of Australian lantana, is very much like a flowering hydrangea, and both plants carry personal nostalgic significance to both scientist and artist. We used this painting as a backdrop for a projected animation of a “popcorn fish” undergoing this transition – popcorn was used to represent the developing embryo, which burst into colour and life at the transition from maternal to embryonic control. With this animation, representing an individual fish, projected onto a circular print of Jo's *All for Love* painting, the effect was of a spotlight on an independent organism undergoing a transition on the background of a Petri dish. The lantana not only resemble other embryos visually, but also hint at the blossoming transition being undertaken.

Amy Dowdle: The topic of my PhD is developmental genetics; specifically, I aim to gain novel insights into genome activation from studying nuclear structure. I hypothesise that formation of a three-dimensional, transcriptionally competent genome is the trigger for genome activation following conception of a zygote. This project requires imaging zebrafish embryos at various stages to map the changes in nuclear structure, in conjunction with a HiC experiment to capture interactions occurring throughout early development.

Previously of Dunedin, currently based in Brisbane, Australia, painter and multi-disciplinary artist **Jo St Baker** is working on projects that blur the boundaries of multiple art genres. Along with her busy arts practice, she is director and curator of the studio + venue creative art space, Mon Komo Hotel, Redcliffe. Jo's sculptural work *The Sandmen* is a finalist in the touring Queensland Regional Art Award and she is currently back in New Zealand for a two-month residency at the Dunedin School of Art.