Proxies of Extinct Species Information Sheet

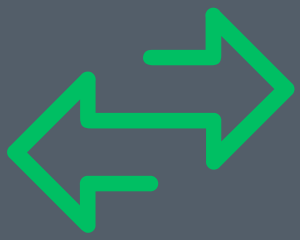
TE TIRA WHAKAMĀTAKI

What is it?

You may have heard of this tool called de-extinction, but the actual name for this process is proxies of extinct species, as we can never actually make the species exactly the same. This tool is like a scientific time machine, aiming to bring back animals and plants that have disappeared from the Earth. This movement has been led by a private company, Colossal Biosciences, who have focused, so far, on trying to resurrect the woolly mammoth, tasmanian tiger, and dodo. They claim that this is a way to restore balance to ecosystems and repair some of the damage caused by human activities, by reintroducing extinct species. However, many are critical of this plan, while we may be able to bring back one or two members of a species, a huge number would need to be resurrected to create strong populations, and that costs money. Money spent here on resurrection, is money that could be spent on stopping the next extinction. While others, think that the additional research into genes and recreating extinct species will be a net positive for ongoing conservation efforts, bringing us closer to prehuman environments.

How it works

Think of an extinct species as a song that has been forgotten. Now, imagine a composer is trying to recreate this song. They start by listening to fragments of recordings, studying old sheet music, and consulting with experts who remember the tune. They manage to piece together the melody, harmonies, and rhythms until something as similar to the song as possible comes to life once again. Similarly, in this tool, **scientists gather genetic fragments from museum specimens and analyse closely related species to reconstruct the genetic 'song' of the extinct species**. Once the genetic make-up is known, they take the DNA of a similar species and edit it to match the newly recovered genetic code. So, for example, an elephant genome would be modified to recreate the woolly mammoth. They then transplant this DNA into an embryo, implant the partially developed embryo into the similar species and the extinct species is born from its surrogate parent.



Does it change the DNA?

Yes, it requires the DNA of a similar species to be changed. This change would then be passed on to the new proxy species.

Has it ever been used?

No, there has never been a proxy of an extinct species created, although research is looking into it.

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How could this be used in Aotearoa?

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In Aotearoa, the huia is a taonga species that became extinct in the early 20th century due to habitat loss and hunting. As well as their huge cultural value, they had a unique job in the ngāhere, foraging in bark and wood for insects, including huhu and wētā. Culturally, the huia was a sign of chieftainship. This extinction has had huge cultural impacts, a perfect example of how colonisation has impacted the natural and cultural landscape of Aotearoa.

If scientists were to bring back the huia, firstly, they would need samples from huia remains currently housed in museums and personal collections. Then, they would analyse them to sequence the DNA of the huia, or, to create the song. They would then take an embryo from a closely related species, like a tīeke (saddleback), and modify those genes to be as close to the huia as possible. Importantly, while it might be possible to find most of the genes that make up a huia, making a perfect set of identical huia genes is not doable. After the tīeke embryo has been modified, the tīeke then acts as a surrogate and lays the egg, which would hatch our huia. This huia would not have any biological whanau, and unless genetic variation is found amongst samples, and different sequences are created for each embryo, they would all effectively be clones of each other.

Why should you care?

Currently, proxies of extinct species are still in early development stages, but with hundreds of millions of dollars' worth of private funding going into groups like Colossal Biosciences, it may soon be a reality. This type of research means that one day we may be able to resurrect species such as the huia, but should we? A project like this would require large amounts of funding, that would potentially be taken away from other conservation projects, or is the potential to bring back what we lost so great that it's worth the risks and money required? Ultimately, scientists are divided, with some excited by these new technologies, others see it as a waste of time, and a distraction from the more pressing needs of the wider conservation space. If you would like to learn more, please check out the links to the right.

References and Additional Information

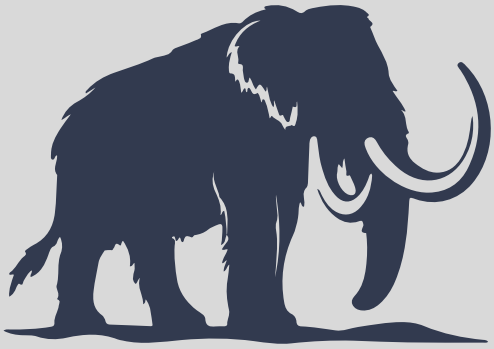
De-extinction: a novel and remarkable case of bio-objectification - Academic Article

A 'De-extinction' Company Wants to Bring Back the Dodo - Article

The Case Against De-Extinction: It's a Fascinating but Dumb Idea - Article

Bringing extinct animals back to life - Article

Recreating extinct species- Article



Disclaimer: While we are committed to being a part of these conversations regarding Aotearoa New Zealand's future in synthetic biology, Te Tira Whakamātaki are neither for nor against the use of synthetic biology technologies for environmental protection purposes. The purpose of this information sheet is to inform, educate, break down and explain some of the different terms and tools. This tool has been selected because it is frequently in the media and mentioned to us often, not because we hold any opinion on them.

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