DNA and gene editing are the real stars of the new Jurassic Park movie

If a new Planet of the Apes or Jurassic Park film comes out, I'm going to go see it. The latest, Jurassic World: Dominion, didn't disappoint.

A plague of locusts

The science is mostly accurate, the bioethics message obvious, and the plot adheres to Isaac Asimov's "change one thing" rule for science fiction. In the world of Jurassic Park, that lone variable is time. We just have to accept that a "titanosaur" like Argentinosaurus somehow grew and developed from a lab-nurtured baby to a 130-foot-tall and 110-ton adult in a few years.

The official summary from IMDb for the new film is vague and continues the impossibly-rapid-growth theme:

> Four years after the destruction of Isla Nublar, dinosaurs now live–and hunt–alongside humans all over the world. This fragile balance will reshape the future and determine, once and for all, whether human beings are to remain the apex predators on a planet they now share with history's most fearsome creatures in a new Era.

Four years? Animals radiating around the world? Even rats or rabbits couldn't do that. And the film is actually more about insects.

Evil company Synbio has let loose hordes of genetically modified locusts, each the size of a shoebox. They eat only crops that haven't been grown with the company's insecticide. (Old story, the first GMO corn was grown in 1996.) The rapidly-reproducing, gargantuan locusts are expected to decimate the nation's crops by summer's end.

The upper floors at Synbio appear innocent: a “clearinghouse” to rehab the poor reptiles roaming the planet after they burst free in the last movie. The beasts are then sent to a Wildlife Relocation Center in Pennsylvania or to a facility in the Dolomite Mountains of Italy for some R&R. Synbio bought the company behind Jurassic Park back in the 90s, and it is now focusing on saving 20 key species.

But there are other parts to the company.

The Habitat and Development Laboratory contains “untouched genomes of rare species.” Underground lies Synbio’s top secret project, “hexapod.” Six legs.

The company is conveniently near amber deposits that provided the initial dino DNA back in the 1990s in preserved mosquitoes, and this time around, the locust genetic material. The amber mine looks a lot like Howe Caverns, near where I live in upstate New York.

Of course other folks have dinos too. Sawridge Cattle Company in western Nevada, for example, is now an “illegal breeding facility.” Cute baby triceratopses are stuffed into cages like the ones at county fairs that house pigs.

Bring in the clones

The locusts and dinosaurs are the backdrop to the human drama that centers around 14-year-old Maisie Lockwood (Isabella Sermon), granddaughter of Sir Benjamin Lockwood. He was the business partner of John Hammond, both responsible for the modern-day dinos in the first place.

Maisie, it turns out, is a clone. Her mother, Charlotte (Elva Trill), wanted to have a kid, so why not just clone herself? The 23 human chromosome pairs on her computer screen announce that she is a geneticist, although I’m a geneticist too and I never feel the need to remind myself of the number, which isn’t useful for anything.

Young Maisie is precocious and gorgeous and for unexplained reasons, has an English accent. Owen Grady (Chris Pratt) and Claire Dearing (Bryce Dallas Howard), from the last movie, adopt her and they live in the woods to protect her from kidnappers.

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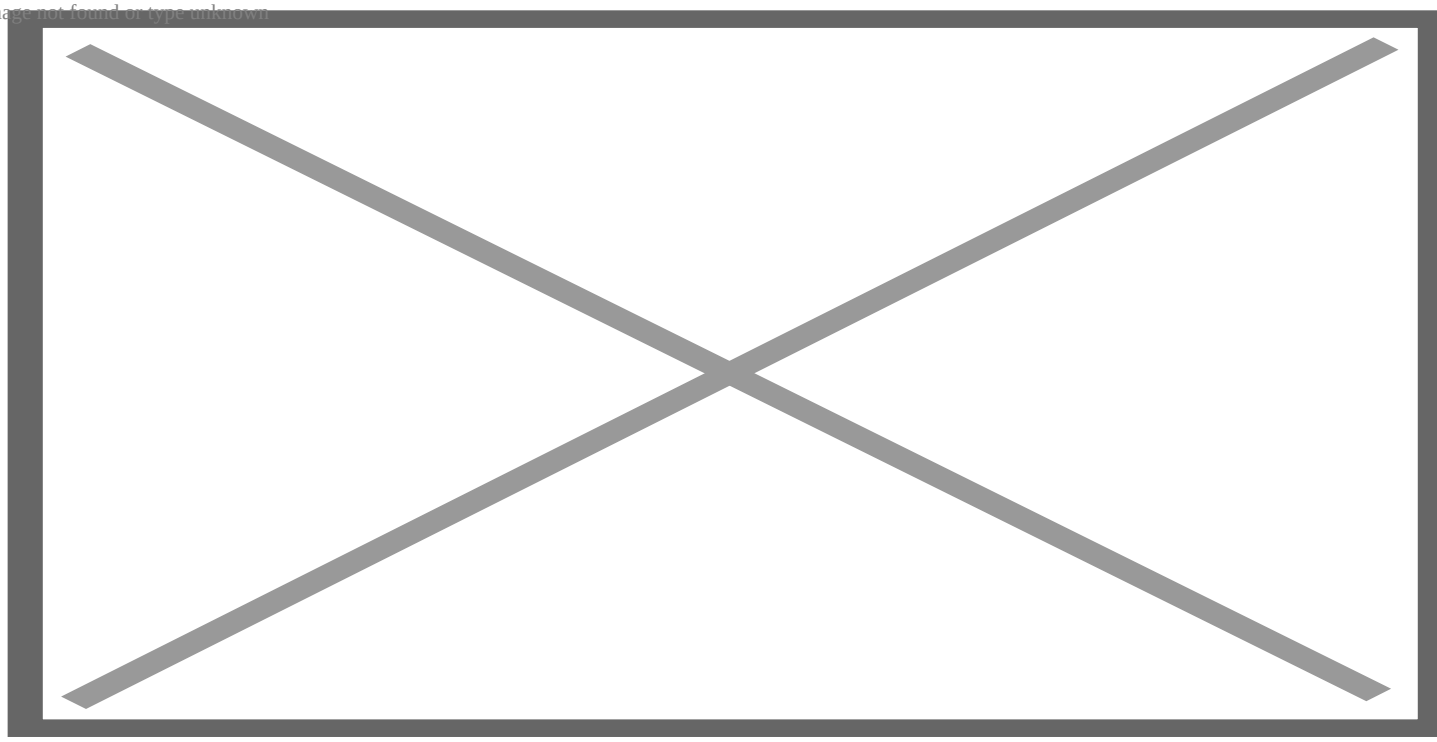

Maisie Lockwood. Credit: Screen Rant

A few dinosaurs live near their house, and Maisie befriends an adorable mom and her baby, Blue and Beta. They arose from dino DNA mixed with monitor lizard DNA, like the frog DNA patched into the genomes of the original Jurassic Park dinos. “We need the little raptor to understand you. They are genetically identical, like you and Charlotte. Charlotte, like Blue, was able to have a child all by herself,” sneers a kidnapper, for Maisie, too, arose without the contribution of a sperm.

But why would anyone want to kidnap Maisie? Why is she “the most valuable IP on the planet”?

Gene therapy and editing to the rescue

When Maisie was a toddler, her mother Charlotte, much to her surprise despite the chromosomes on her screen, suddenly sickened from an unnamed, undiagnosed genetic disease, even though young-adult-onset of a genetic disease is rare. Oops! She cloned a child with a mystery mutation!

Not to worry. Charlotte whipped up some viral DNA to deliver working genes, something that’s been done in gene therapy since the first experiments, in 1990, coincidentally when Michael Crichton published Jurassic Park. Back then, we could just add genes in gene therapy. But now, thanks to gene editing techniques like CRISPR, we can also remove the bad genes.

Presumably such a gene swap is what Charlotte did to beget Maisie. Whatever she did, we know that the important part is that she made the change in “every single cell” of her toddler’s body, which is difficult to envision. Several characters say “every single cell” so we know it is true, although with current technology,

that is not possible. Gene therapy on a person targets specific cell types that are involved in the disease.

However Charlotte jettisoned the bad genes out of her kid, Maisie is here, and she holds the secret to how pathologist Henry Wu (BD Wong from Law and Order) can rid the world of the locusts: apply the same technology that Charlotte used to knit a genetic change into all the trillions of her daughter's cells.

jurassic world dominion giant locust feature

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"She changed every cell in your body," Wu reminds Maisie. "If I can figure out how, I can change the entire swarm before it's too late. Your DNA could change the world! If I could, I could fix a terrible mistake that I made," he laments, referring to the bioengineering of the giant locusts.

A large-scale change that eradicates a species, even if locally, is indeed possible with a technology called a gene drive. I explain it here. It's not a very good idea.

A Jurassic Park 30th reunion

The problem of the locusts is so profound that the old characters from the original Jurassic Park, circa 1993, come aboard. They re-enact some of the old bantering and flirting, nearly verbatim.

Laura Dern's Ellie Sattler gee-whizzes and eye-bulges. She's the paleobotanist who stuck her hands in dino doo in the inaugural film. She helpfully identifies the locusts as a species that died out during the Cretaceous period (145 to 66 million years ago).

Grumpy paleontologist Alan Grant (Sam Neill) is still grumpy, while pontificating mathematician Ian Malcolm (Jeff Goldblum, also of The Fly fame) still is plagued by clichés: "ethics of genetic power," "we

must trust in humanity," "unforeseen consequences," and the nonsensical "we must transform human consciousness." He works for the evil company – or so it seems. Synbio's work, he spouts, will cure autoimmune disease, cancer, and Alzheimer's.

Ian invites Ellie and Alan to visit Synbio. Upon arrival, Ian slips her a key to the locust lab.

They've all aged remarkably well, trim and with great hair and skin. This contradicts the "change one thing" mantra of rapidly-developing dinosaurs; non-aging humans.

Several boring chase scenes ensue, the one of barbecuing locusts the most intriguing. The main characters spend about 45 minutes running around the Synbio facility to steal a sample of DNA. It is unclear exactly why they're doing this, because they can easily get DNA from Maisie, and they're surrounded by the insects, presumably pooping DNA all over the place.

As the movie drags on, more chase scenes happen, in response to various "asset containment breaches." The most exciting is a duel between two ferocious dinos: "two apex predators in one place!" Ellie chants. Oh my!

In yet another scene, as a horrified Claire looks on in a forest, a ginormous dino slurps up deer like my husband eats Trader Joe's potato chips.

Our friends, after many near-death experiences, save the day. The surviving humans flee as dinos burn. At an unnamed later time, Dr. Wu waves a magic wand and the locust problem is solved.

Borrowing from other films

The plot holds together loosely. What kept me awake, once I'd gotten over the novelty of the dinosaurs (yes, they have feathers), were the scenes borrowed from other films and TV shows.

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Owen spies a pterodactyl on the wing of a plane that resembles Star Wars' Millennium_Falcon, echoing the Nightmare at 20,000 Feet Twilight Zone episode in which William Shatner (aka Captain Kirk) spies a monster on the wing of a plane.

"Why did it have to be snakes?" uttered Indiana Jones after plunging into a serpent-filled chasm. "Nobody said there'd be bugs!" is the new version.

Claire bails out of the Millennium Falcon and evokes the winged monkeys of the Wizard of Oz. Later on, she's spies small dinos pop up from the shrubbery like the munchkins along the yellowbrick road.

Claire and Owen sneak into the locust lab wearing white suits that look EXACTLY like the deployed sperm in Woody Allen's Everything You Always Wanted to Know About Sex.

For no clear reason, there's a re-enactment of the cantina scene from Star Wars, complete with locusts turning on a barbecue spit, gambling, and drinking.

Despite the absurdity of populating a planet with full-grown, bellowing dinosaurs in a fraction of time, I'll go back for the next installment of Jurassic World. Meanwhile, I'd like to know how Ellie, Alan, and Ian aged

so well.

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