

## Anatomy of the demon Demogorgon from 'Stranger Things': Is there a real-life counterpart?

The Netflix series [\*"Stranger Things,"\*](#) although terrific, might ditch the clichéd doctor-scientist in charge and get themselves a developmental biologist, stat. The disseminated beast that is invading, sliming, and gobbling the residents of a small Indiana town reminds me of one of my favorite organisms, the cellular slime mold.

### Demogorgon

Set in the early 1980s, the story opens with four boys in a basement in Hawkins, Indiana, imagining confronting the demon prince from *Dungeons and Dragons*, the monstrous Demogorgon. Biking home, Will Byers is abducted by one. It has oozed through a portal beneath a nearby government lab from an alternate universe the kids come to call the Upside Down.

Anyone raised on the horror movies of the 1950s and 1960s, and/or the coming-of-age stories of the 1980s and thereabouts would love this show. It's the creation of twins Ross and Matt Duffer.

### Influences

At first, the series brings to mind [\*Stand By Me\*](#), which the actors read for auditions, and [\*The Goonies\*](#). But it's much more.

Will's frantic mother Joyce (Winona Ryder, Kim from 1990's [\*Edward Scissorhands\*](#)) is modeled after the Richard Dreyfus character in [\*Close Encounters of the Third Kind\*](#). And Will's obsessive drawings that mirror the passageways of the Upside Down are akin to Dreyfus's fashioning in mashed potatoes a model of the Wyoming mountain, Devil's Tower, that leads him to the aliens.

The Demogorgon echoes 1958's [\*The Blob\*](#), the gut-bursting 1979's [\*Alien\*](#), and it's mode of communication through crackling phone wires and static-riddled TVs, 1982's [\*Poltergeist\*](#). Sprinkle in some [\*E.T.\*](#), [\*The Exorcist\*](#), and [\*Carrie\*](#). But *Stranger Things* is so imaginative that I can't readily explain or refute the biology, as I usually can. With *Wayward Pines*, which the Duffer brothers also wrote, the precedent of a split humanity in H.G. Wells' *The Time Machine* was clear. Still, in *Stranger Things*, the Duffers have an opportunity to showcase some real, amazing science in the next two seasons.

First, a synopsis (I'm omitting a lot). *Spoiler warning.*

### From one Halloween to the next

In season one, Joyce and chief of police Jim Hopper look for Will, as a bald girl in a hospital gown and "011" tattooed on her forearm escapes from the lab and befriends Will's buddies. Then the walls of Will's home ooze slime, Eleven's telekinetic powers emerge, and we meet evil head doctor/scientist Martin Brenner (Matthew Modine). At a party, socially awkward teen Barb vanishes into a swimming pool and is

mysteriously eaten, and another teen who is sucked into a tree trunk encounters the beast in the Upside Down but is pulled out. Will communicates intermittently through the aforementioned phones, blinking lights, and letters on the wall, like a Roku from another dimension.

We learn that Eleven's mother was part of a program modeled after the real CIA's MKULTRA, which was borne of the anti-Communist paranoia of the 1950s and halted in 1966. MKULTRA entailed "the research and development of chemical, biological, and radiological materials capable of employment in clandestine operations to control human behavior," according to released documents, and some 200 or so colleges, universities, hospitals, research foundations, prisons, and chemical and pharmaceutical companies partook, using a smorgasbord of [mind-altering drugs](#) on unsuspecting participants to investigate how to train people to not spill secrets under torture. Eleven's mom was treated before she knew she was pregnant, and Eleven was snatched away at birth and brought up in the lab – until she escaped the night Will disappeared.

At the end of season one, the fully formed Demogorgon emerges from a wall at the middle school and envelopes Eleven. Will returns home and seems fine, but in the very last scene, he brushes his teeth, spits into the sink, and a little tadpolly thing slithers down the drain. *Uh-oh*.

Will is back home in *Stranger Things 2*, a year later, Halloween time of course. Eleven is back too, but hiding in the woods with the police chief.

Plagued with visions of the Upside Down, Will scribbles crayon drawings that are pieces of a giant map that Joyce frantically tacks to the walls. He envisions the full-fledged enormous "shadow monster," draws it, and actually sees it emerging from behind the treetops. When the brave boy tries to stand up to the menacing creature, it grows ever larger and then suddenly swooshes tentacles into Will's every orifice. I screamed. I can't imagine what little kids watching that did. But not to worry. *Stranger Things* pingpongs from horror to camp much like *Edward Scissorhands* and *The Stepford Wives*.

Soon Will's friend Dustin hears a noise in a trash can, peeks in, and sees and then scoops up a cute little lizardy creature. Once home Dustin evicts his tortoise from his tank and deposits his find, names him Dart, and feeds him bite-sized 3 Musketeers bars from his Halloween stash. When Dart grows really fast and then eats Dustin's orange cat, the nougat apparently nutritionally insufficient, it's clear that the new pet, now escaped, is a baby Demogorgon – like the one that Will spit up at the end of season 1.

*Dart has friends!* The adolescent Demogorgons communicate telepathically and sprout four limbs, becoming able to hunt, spring, and tear flesh, just like coyotes. Dustin calls them demodogs.

Will's drawings guide the cops to the monsters' tunnels beneath a rotting pumpkin field, but when the passageways are torched, Will shrieks in agony. Meanwhile, back at the lab, mellow, white-coated Dr. Sam Owens, Paul Reiser of [Aliens](#), aka "doc," has replaced Matthew Modine, who died at the end of the first season. (I was thrilled because I sat with Paul at the kids' table at seders when we were very young; from opposite ends of a large family, we shared aunt Kay and uncle Bernie.)

The battle between the good folks of Hawkins and the Demogorgons escalates, but Eleven seems to save

the day. As season 2 sweetly ends, however, the Duffers drop a final scene that suggests otherwise.

## The taxonomy of the demogorgon

The CIA-inspired mind control experiments created a shared consciousness between the fetal Eleven and the Demogorgon. But we don't know whether the doctor/scientists inadvertently created the alternate dimension or it just sprung up beneath the lab, nor how Will became a vessel for the beast, like Reagan in *The Exorcist* channeling the devil. Dr. Owens fleetingly mentions a virus, but I think he meant it metaphorically, but the characters seem to think he was being literal. I guess we'll find out in 2018.

As a good biologist, I've tried to classify the [Demogorgon](#):

- *Anatomy*: a hybrid of an amphibian, a mole, a canine of some sort, and Audrey the carnivorous plant from 1986's [Little Shop of Horrors](#)
- *Nutrition*: Eats orange cats, nougat, and people, but not the bones
- *Digestion*: Cuts through limestone, like the formic acid-emitting atomic bomb radiation-induced human-eating giant ants in the 1954 film [Them](#) and the silicon-based [Horta](#) from *Star Trek*
- *Excretion*: Emits slime
- *Development*: From tadpole to juvenile to velociraptor-like adolescent to huge tentacled tree-like shadow monster
- *Habitat and portals*: The alternate universe of the Upside Down, including within walls, under pumpkin patches, in tree trunks and swimming pools, in backyard forts, in the sky, in the human digestive tract and brain, and throughout vast subterranean labyrinths and caves
- *Nervous system*: Communicates over landline phones, through lights and cameras and TV screens, through Will Byer's body and consciousness. Hunts in packs. Plans. Collective consciousness, like the hive mind of *Star Trek*'s [borg](#) continuum.

## Clues from the cellular slime mold

The connection among Eleven, Will, and the monsters reminds me of the "social amoeba" cellular slime mold *Dictyostelium discoideum*, but with interspecies communication. Consider its life cycle.

"Dicty" lives as single cells in rotting logs, happily eating bacteria. When the food's gone, the stressed cells emit the biochemical signaling molecule cAMP (cyclic adenosine monophosphate) and 100,000 or so of them meet up, merge, and then set off to find food.



Single cells of the slime mold stream to a central point, forming a slug that will find food.

The starving cells form a mound, like Richard Dreyfus's mashed potatoes, then rise and flop over, forming a gelatinous slug that moves toward light and heat. Finding bacteria, the slug stops, undulates, and its center telescopes upward, forming a "Mexican hat." The hat becomes a "fruiting body" of some 20,000 cells, with a base and a stalk that the rest of the cells ascend. Cells that reach the top cloak themselves as spores, then rain down, dispersing and restarting the cycle as amoebae in the newfound land of plenty.

The slime mold slug bears a passing resemblance to Dart, the baby Demogorgon. Perhaps Dart communicated with the other fledgling monsters via a signaling molecule that Eleven and Will tapped into. After all, human cells use cAMP too. A *Dicty* explanation would be more unexpected than a run-of-the-mill virus, a go-to default in sci fi because you can't picture it, unless you're a biologist.

But does doc know enough about cellular slime molds to see possible parallels to the Demogorgon? Is he aware that [peeing on slime mold slugs](#) squelches their developmental program, like in "The One With the Jellyfish" episode of [Friends](#)? Does the good Dr. Owens actually know anything at all about biology? Seeming unskilled as both a doctor and a scientist, letting others treat Will and battle the monsters, he epitomizes the [Dana Scully fallacy](#), the assumption that all doctors are also scientists. As she repeatedly told us, Dr. Scully from the *X-Files* was a physician *and* a scientist, as if the two are the same. They're not, unless of course you have an MD/PhD. I have a PhD in genetics but I can't hang an IV.

So to borrow from a Seinfeld episode, *is there a developmental biologist in the house?*

**Ricki Lewis has a PhD in genetics and is a genetics counselor, science writer and author of Human Genetics: The Basics. Follow her at her [website](#) or Twitter [@rickilewis](#).**

**A version of this article was originally published on PLOS Blog's website as [“The Biology of “Stranger Things”](#) and has been republished here with permission from the author.**