

# Electric Eels

## ELECTROCUTE

### Evolution



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By Hope  
16 years old

Michigan

Home Schooled  
Senior High Level

## Electric Eels **ELECTROCUTE** Evolution

Sleek, stealthy, and sly, the electric eel lurks about in the murky waters of northern South America,<sup>1</sup> primarily in the Amazon and Orinoco Rivers.<sup>2</sup> Practically at the top of the food chain, the electric eel almost dominates all other creatures in its environment. This is a result of the eel's amazing defense and hunting system. When hungry, disturbed, or endangered, this slim beast can discharge from 650 to 860 volts of electricity, stunning, paralyzing, or even killing the victim.<sup>3, 4</sup> The electric eel is equipped with an amazing internal electrical generator, and is capable of discharging incredibly high voltages of electricity from its body without causing any damage to itself.

This paper will examine this irreducibly complex and undeniably well-designed biological system. It will demonstrate that myriads of gradual mutations, occurring over hundreds of millions of years of evolutionary development, are incapable of producing the electric eel's powerful shocking abilities; and it will show that the electric eel is an amazing testimony to a Divine Creator's mighty Hand.

### **The Electric Eel**

The electric eel (*Electrophorus electricus*) is actually not a true eel, but is a member of a South American species of fish called knifefish, closely related to the catfish.<sup>5</sup> The electric eel

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<sup>1</sup> "Electric Eel –*Electrophorus electricus*," [hCp://www.facts-about.info/electric-eel/](http://www.facts-about.info/electric-eel/) (Accessed January 4, 2021).

<sup>2</sup> "Electric Eel Facts and Information," [hCps://www.bioexpedition.com/electric-eel/](http://www.bioexpedition.com/electric-eel/) (Accessed January 4, 2021).

<sup>3</sup> "Electric Eel –*Electrophorus electricus*," [hCp://www.facts-about.info/electric-eel/](http://www.facts-about.info/electric-eel/) (Accessed January 4, 2021).

<sup>4</sup> Jaymi Heimbuch, "8 Shocking Facts About Electric Eels," <https://www.treehugger.com/shocking-facts-about-electric-eels-4863966> (Accessed January 4, 2021).

<sup>5</sup> *Ibid.*

grows to an average length of eight feet and weight of forty-four pounds,<sup>6</sup> with males being smaller than females.<sup>7</sup>

Unlike true eels, which possess many sharp teeth,<sup>8</sup> electric eels have no teeth at all.<sup>9</sup> They possess a strong sense of smell<sup>10</sup> and hearing,<sup>11</sup> but have poor eyesight.<sup>12</sup> Unlike most fish, electric eels do not have scales. Also, the eel obtains 80% of its oxygen from breathing air with its mouth as it surfaces every 10 minutes. The remaining 20% comes from gill use.<sup>13</sup>

In the wild, an eel can live up to 15 years. In captivity, males can live 10 to 15 years and females 12 to 22 years.<sup>14</sup>

The diet of an adult eel consists mainly of fish, small mammals (like rats), and invertebrates. Juveniles eat invertebrates such as shrimp and crabs, and newly-hatched eels eat eggs and embryos from other nests.<sup>15</sup>

Possible predators of the electric eel are leopards, jaguars, crocodiles, and caimans, but these will only attempt attack during dry summers when the water levels drop in the marshes inhabited by the eel. It may be possible that caimans, American crocodiles, anacondas, and piranhas can eat an electric eel that is already dead or dying. The real predators of the electric eel

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<sup>6</sup> "Electric Eel –Electrophorus electricus," [hCp://www.facts-about.info/electric-eel/](http://www.facts-about.info/electric-eel/) (Accessed January 4, 2021).

<sup>7</sup> Anne Marie Helmenstine, "Shocking Electric Eel Facts," <https://www.thoughtco.com/electric-eel-facts-4148012/> (Accessed January 4, 2021).

<sup>8</sup> Erin Spencer, "The Difference Between Electric Eels and True Eels," [hCps://oceanconservancy.org/blog/2019/07/09/difference-between-electric-eels/](https://oceanconservancy.org/blog/2019/07/09/difference-between-electric-eels/) (Accessed March 18, 2021).

<sup>9</sup> "Electric Eel Facts and Information," [hCps://www.bioexpedition.com/electric-eel/](http://www.bioexpedition.com/electric-eel/) (Accessed January 4, 2021).

<sup>10</sup> Ibid.

<sup>11</sup> "Electric Eel –Electrophorus electricus," [hCp://www.facts-about.info/electric-eel/](http://www.facts-about.info/electric-eel/) (Accessed January 4, 2021).

<sup>12</sup> James MacDonald, "5 Shocking Facts about Electric Eels," <https://daily.jstor.org/5-shocking-facts-about-electric-eels/> (Accessed January 4, 2021).

<sup>13</sup> "Electric Eel –Electrophorus electricus," [hCp://www.facts-about.info/electric-eel/](http://www.facts-about.info/electric-eel/) (Accessed January 4, 2021).

<sup>14</sup> Ibid.

<sup>15</sup> Wikipedia, "Electric eel," [hCps://en.wikipedia.org/wiki/Electric\\_eel](https://en.wikipedia.org/wiki/Electric_eel) (Accessed January 4, 2021).

are those that can quickly pull it out of the water by its tail and asphyxiate it before eating. The otter is one such predator.<sup>16</sup>

During the dry season, the male eel builds a foam nest consisting exclusively of his own saliva, into which the female lays 1,200 to 3,000 eggs. The male then guards the nest well, until the rainy season when the eggs hatch.<sup>17</sup> Young eels, by instinct, care for themselves.<sup>18</sup> It is supposed that electric eels lay three separate clutches of eggs each spawning season.<sup>19</sup>

Typical electric eel habitat consists of freshwater rivers, creeks, streams, floodplains, and swamps. They prefer muddy, stagnant water in heavily shaded areas.<sup>20</sup>

The body of the electric eel resembles that of a snake. Long and cylindrical, it is guided by an anal fin that runs the entire length of the body.<sup>21</sup> The three electricity-producing organs, called the Sach organ, the Main organ, and the Hunter organ, take up eighty percent of the body.<sup>22</sup> Low-voltage electrical charges are produced by the Sach organ, while the strongest charges are produced by the Main and Hunter organs working together.<sup>23</sup> The remaining 20% of the body holds the eel's internal and vital organs. Positioned immediately behind the head, these organs are insulated from the electricity-producing organs by fatty tissues.<sup>24</sup>

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<sup>16</sup> N. Sunil Kumar, "Do electric eels have predators?," <https://www.quora.com/Do-electric-eels-have-predators?share=1> (Accessed April 12, 2021).

<sup>17</sup> Jaymi Heimbuch, "8 Shocking Facts About Electric Eels," <https://www.treehugger.com/shocking-facts-about-electric-eels-4863966> (Accessed January 4, 2021).

<sup>18</sup> "Electric Eel Facts and Information," <https://www.bioexpedition.com/electric-eel/> (Accessed January 4, 2021).

<sup>19</sup> Jaymi Heimbuch, "8 Shocking Facts About Electric Eels," <https://www.treehugger.com/shocking-facts-about-electric-eels-4863966> (Accessed January 4, 2021).

<sup>20</sup> "Electric Eel – Electrophorus electricus," <https://www.facts-about.info/electric-eel/> (Accessed January 4, 2021).

<sup>21</sup> Wikipedia, "Electric eel," [https://en.wikipedia.org/wiki/Electric\\_eel](https://en.wikipedia.org/wiki/Electric_eel) (Accessed January 4, 2021).

<sup>22</sup> "Electric Eel – Electrophorus electricus," <https://www.facts-about.info/electric-eel/> (Accessed January 4, 2021).

<sup>23</sup> Jaymi Heimbuch, "8 Shocking Facts About Electric Eels," <https://www.treehugger.com/shocking-facts-about-electric-eels-4863966> (Accessed January 4, 2021).

<sup>24</sup> Dominic Statham, "Stunning and stealthy," <https://creation.com/electric-eel> (Accessed January 4, 2021).

The eel electrocutes victims when hunting or in self-defense. While hunting, the eel broadcasts an electrical discharge into the surrounding water.<sup>25</sup> When the electric field is disturbed by objects passing through it, the eel detects that and sends out a high-voltage discharge to shock its prey. The eel is capable of producing thousands of shocks in minutes, rendering prey unable to quickly recover and escape.

When threatened, the eel will emit a high-voltage shock in an attempt to deter its predator. If that does not dissuade the predator, the eel will attempt escape by swimming away into the low-oxygen, vegetation-choked areas at the surface of the water.<sup>26</sup> If the predator is outside of the water, the eel will leap out of the water and lunge at the predator, trying to electrify it.<sup>27</sup>

The eel's ability to produce electricity in its own body results from special, disc-shaped cells which comprise the electricity-producing organs.<sup>28</sup> These cells are called electrocytes.<sup>29</sup> The Main and Hunter organs consist of about 5,000 to 6,000 electrocytes.<sup>30</sup>

When the eel senses danger, or a nearby meal, its brain creates a nervous impulse signaling ion channels in the electrocytes to open. Sodium ions then flow through the open channels reversing the polarity of the cells. This reversal creates an electric current producing

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<sup>25</sup> James MacDonald, "5 Shocking Facts about Electric Eels," <https://daily.jstor.org/5-shocking-facts-about-electric-eels/> (Accessed January 4, 2021).

<sup>26</sup> Ibid.

<sup>27</sup> Jaymi Heimbuch, "8 Shocking Facts About Electric Eels," <https://www.treehugger.com/shocking-facts-about-electric-eels-4863966> (Accessed January 4, 2021).

<sup>28</sup> Anne Marie Helmenstine, "Shocking Electric Eel Facts," <https://www.thoughtco.com/electric-eel-facts-4148012/> (Accessed January 4, 2021).

<sup>29</sup> Tom Giardina, "Electric Feel: Scientist explains how eels make electricity," <https://www.pressconnects.com/news/> (Accessed January 4, 2021).

<sup>30</sup> Anne Marie Helmenstine, "Shocking Electric Eel Facts," <https://www.thoughtco.com/electric-eel-facts-4148012/> (Accessed January 4, 2021).

0.15 volts of electricity per cell. Working together, all the cells can produce one ampere of current and 860 watts of electricity for two milliseconds.<sup>31</sup> [watts=voltage x amperage]

The eel has the ability to vary the intensity of the shock, concentrate the electric power of the shock by curling up, or repeat the shock intermittently for over an hour without growing tired.<sup>32</sup>

### **Where did it come from?**

An amazing creature has just been described and examined. Unlike the majority of living organisms on earth, this creature is capable of producing enough electricity within its own body to be useful in hunting and defense. It possesses, as one man put it, a “power plant [that] eclipses anything produced by man, being compact, flexible, portable, eco-friendly, and self-repairing.”<sup>33</sup> What gave it these amazing electricity-producing abilities? Did it descend from some totally unrelated organism, and then over millions of years evolve into its present form? Or was it designed and created by the Hand of the Almighty God?

Both of these viewpoints will be examined. First, the process by which evolutionists propose electric eels obtained their electricity-producing ability; then, the creationist explanation of how the eel was created by God. Lastly, scientifically accurate and logically sound reasons will be examined, showing how and why evolution, as the answer to the eel’s origin, is impossible.

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<sup>31</sup> Ibid.

<sup>32</sup> Ibid.

<sup>33</sup> Dominic Statham, “Stunning and stealthy,” [hCps://creation.com/electric-eel](https://creation.com/electric-eel) (Accessed January 4, 2021).

### **Evolutionary Attempts**

According to evolutionary assumptions, eels began gaining electricity-producing ability 100 to 200 million years ago. It is hypothesized that the electrical potential, already present in all nerve and muscle cells, began to be amplified.<sup>34</sup> The electric eel's ability to direct electrical current increased while the conversion of electrical stimuli into muscle contractions decreased.<sup>35</sup> Eventually, muscle cells evolved into much larger cells called electrocytes (described previously), capable of generating higher voltages. Evolutionists claim that this process occurred six separate times in totally different fish.<sup>36</sup>

### **God's Word explains**

“And God said, Let the waters bring forth abundantly the moving creature that hath life... And God created great whales, and every living creature that moveth, which the waters brought forth abundantly, after their kind... and God saw that *it was* good. And God blessed them, saying, Be fruitful, and multiply, and fill the waters in the seas... And the evening and the morning were the fifth day.” (Genesis 1:20-23)

The Bible clearly explains the origin of the electric eel. By the Word of His Mouth and the might of His Hand, God commanded and the waters brought forth abundantly all manner of creatures. On the fifth day of the creation week, God created a complete electric eel with fully-

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<sup>34</sup> Jonathan O'Callaghan, “That's shocking! Genes reveal electric eels evolved their supercharged muscles separately 200 million years ago,” [hCps://www.dailymail.co.uk/sciencetech/articles-2671986/Thats-shocking-Genes-reveal-electric-eels-evolved-supercharged-muscles-separately-200-million-years-ago.html](https://www.dailymail.co.uk/sciencetech/articles-2671986/Thats-shocking-Genes-reveal-electric-eels-evolved-supercharged-muscles-separately-200-million-years-ago.html) (Accessed January 4, 2021).

<sup>35</sup> Janet Fang, “How Electric Fish Evolved Shocker of an Organ Six Times,” [hCps://www.iflscience.com/plants-and-animals/how-electric-fish-evolved-shocker-organ-six-times/](https://www.iflscience.com/plants-and-animals/how-electric-fish-evolved-shocker-organ-six-times/) (Accessed January 4, 2021).

<sup>36</sup> Nell Greenfield Boyce, “A Shocking Fish Tale Surprises Evolutionary Biologists,” [hCps://www.npr.org/2014/06/26/325246710/a-shocking-fish-tale-surprises-evolutionary-biologists](https://www.npr.org/2014/06/26/325246710/a-shocking-fish-tale-surprises-evolutionary-biologists) (Accessed April 26, 2021).

functioning shocking powers. He did it with His power and wisdom for His glory, which the eel clearly shows.

As Job exhorts in Job 12:7, 8, 9: “But ask now...and the fishes of the sea shall declare unto thee... Who knoweth not in all these that the Hand of the Lord hath wrought this?”

The eel itself testifies to its Creator.

### **Eel evolution is a far-fetched assumption**

While considering the electric eel with an unbiased mind, nothing would stand out as a clear indication that the eel has an evolutionary history. Eel evolution is an attempted answer to the question “If not God, then what?” This hypothetical explanation was invented, not because it had any supporting evidence, but because it was needed to explain an already-drawn conclusion. Consequently, many problems appear with this evolutionary theory.

In his article “Stunning and stealthy, the amazing electric eel,” Dominic Statham (a Chartered Engineer from Loughborough University, UK) makes an excellent observation: “It is difficult to imagine how this [the evolutionary process] could have happened through small steps, as the Darwinian process requires.”<sup>37</sup> He concludes this based on three reasons examined here.

1. The first shock generated by an evolving electric eel would have needed to be significant enough to successfully stun its prey. If not, the prey would not be stunned, but rather warned of danger, thus having a chance to escape before the eel was able to catch it.<sup>38</sup>

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<sup>37</sup> Dominic Statham, “Stunning and stealthy,” [hCps://creation.com/electric-eel](https://creation.com/electric-eel) (Accessed January 4, 2021).

<sup>38</sup> Ibid.



This is an important point because if the first shock was not significant enough than it can be concluded that for quite a few million years, eels possessing insignificant and unsuccessful electrifying abilities would have either all died out, because of their inability to hunt and defend themselves, or they would have gone on hunting and defending themselves like all other non-electric fish, thus proving that they had no need for the ability to use electricity to perform these vital duties and that this ability would in no way improve their life or survival as a species.

For evolution to randomly produce an ability in an animal which would not improve that animal's life in any way is totally contrary to the intended purpose of evolution. If evolution's random mutations only occur to improve life, its processes, and survival chances, why would it create an ability which had no purpose and met no need? Mutations that do not provide a survival benefit for the creature, will, in future generations be lost. For evolution to work, a mutation must be beneficial and it must survive to the next generation so that a new mutation can be built upon it.

2. During the evolution of the electricity-producing ability in the eel, a system to protect the eel's other internal organs from the electricity would also need to evolve at the same time. Therefore, every time a mutation occurred to increase the voltage of electricity produced, another mutation improving the self-protection system would also need to occur.<sup>39</sup>

This is true, but more importantly this is not even possible. It is impossible for evolution to cause these two different mutations to occur in this alternating manner because evolution does not and cannot have the foresight required to accomplish such a thing.

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<sup>39</sup> Ibid.

3. In electric eels today, all their vital organs are in a small space directly behind the head. Statham proposes<sup>40</sup> that to get all the organs in that place would likely require many mutations to arise together.

These are not the only questions the evolutionary hypothesis raises.

According to the hypothesis, “Between 100 and 200 million years ago, some fish began to amplify that potential;”<sup>41</sup> in other words, the already existing electrical potential in some fish began to be amplified.

But, what was the cause behind the electrical potential suddenly amplifying? Where is the evidence that this happened 100 to 200 million years ago? Where is the evidence that anything within the electric eel is a product of evolution? If no evidence can be shown, why is the Biblical account of special creation not considered as a real possibility for the electric eel’s origin? Since the process of evolution is a series of blind, unguided, and random changes, it is impossible for it to create an organism with such clear evidence of irreducible complexity.

Evolutionists themselves admit there are serious problems with their hypothesis. This is illustrated in the following quotes from one evolutionary article:

“Scientists say it’s amazing that evolution invented an organ for making electricity even once. But, in fact, evolution did it at least six separate times in completely different fish—how is that possible?”<sup>42</sup>

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<sup>40</sup> Ibid.

<sup>41</sup> Jonathan O’Callaghan, “That’s shocking! Genes reveal electric eels evolved their supercharged muscles separately 200 million years ago,” [hCps://www.dailymail.co.uk/sciencetech/articles-2671986/Thats-shocking-Genes-reveal-electric-eels-evolved-supercharged-muscles-separately-200-million-years-ago.html](https://www.dailymail.co.uk/sciencetech/articles-2671986/Thats-shocking-Genes-reveal-electric-eels-evolved-supercharged-muscles-separately-200-million-years-ago.html) (Accessed January 4, 2021).

Leonard Maler, a professor and Faculty of Medicine at the University of Ottawa who conducts experiments in basic neuroscience on electric fish, noted “that to create an electric organ, many genetic changes have to happen—and each one on its own wouldn’t seem to be advantageous for the fish. For example, a muscle that loses its ability to contract is a pretty lousy muscle.” He also said, “You have to simultaneously co-evolve genes that do very many different things in some kind of directed manner. It [can’t just] be random.”<sup>43</sup>

Not only are evolutionists jumping to completely unsupported conclusions in relation to the electric eel’s origin, they admit that those conclusions are questionable and awfully far-fetched.

Until evolutionists can present at least some supporting evidence and a sensible hypothesis showing how the electric eel obtained its shocking abilities, their view is not worthy to be considered as a potential answer, let alone believed.

### **Conclusion**

In this article, the electric eel was examined and its origin discussed. The question “How did the electric eel come to possess this amazing ‘power plant’ and the ability to shock other creatures using high-voltage electricity?” has been explored and two potential answers examined. Either the eel was a result of random evolutionary processes spanning millions of years, or it was the direct result of a mighty Creator purposefully forming it.

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<sup>42</sup> Nell Greenfield Boyce, “A Shocking Fish Tale Surprises Evolutionary Biologists,” <https://www.npr.org/2014/06/26/325246710/a-shocking-fish-tale-surprises-evolutionary-biologists> (Accessed April 26, 2021).

<sup>43</sup> Ibid.

Careful examination of present evidence and evaluation of the arguments of each position leads to the latter conclusion. Evolutionary processes could not have produced this irreducibly complex organism; therefore, only one answer is left—the electric eel was created with purpose by God.

“Let the heaven and earth praise Him, the SEAS, and EVERYTHING that moveth THEREIN.” Psalm 69:34

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