What Darwin Never Knew

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NARRATOR: One question: "Why is there such a stunning diversity of life?"

One answer: "Evolution. Charles Darwin's brilliant theory that explains how species adapt and change." It's more called the most ideas anyone ever had. But there's one big problem. How does it actually work?

Many extraordinary science is answering that question. It's uncovering the hidden mechanisms inside creatures' bodies that can create astonishing transformations. We now know can evolve from dinosaurs, why a fish was once your ancestor and above all, what makes us human.

Right now on NOVA, you'll find out what Darwin never knew.

The one of life on Earth, a tree of stunning diversity. 10,000 species of birds, 300,000 kinds of beetles, 30,000 types of fish, 5,000,000 living species and counting. And we are just one of them.

But why is there such an amazing variety of animals? Why are there so many types of fish, so many different species of beetles? How did this extraordinary profusion of life on Earth come about?

Today we celebrate the man who sought definitely answer that question. Charles Darwin.

He was born 200 years ago, and in a 150 years since he published his book, he has become the icon of our understanding of life on Earth.

CLINT ROBB: Biologist/Medical Schools. What Darwin wanted to understand was how you get this extraordinary diversity of life on Earth. He was born on the Isle of Wight.

NARRATOR: Darwin's theory of evolution, his account of why species adapt and change, has been called the best idea anyone ever had.

But even Darwin admitted that his work was incomplete. Many questions were left unanswered. And the biggest question was, "How?" How did evolution take place?

BRIAN K. HALLGRIMSON: Professor of Anatomy, Head of Developmental Genetics, Medical Institute. He didn't know any of the mechanisms of that process. He didn't understand the physical forces that would actually change the way species appeared.

NARRATOR: But today we can answer the questions that Darwin could not. We can look under the hood of evolution, and see exactly how the mechanism process gives rise to such astounding diversity.

CLINT ROBB: What's accessible about this moving from a scientific perspective, is we're going to be able to understand that diversity and that gave rise to the mechanism. It doesn't necessarily is a criterion it all the same changes.

NARRATOR: And this is the magic and mystery of evolution, most work of time as single species gives rise to many. We uncover that evolution is because the ancestors of all that Darwin saw, such as fish and species, are now deep within a large and complex human, inhabiting one to dominate the planet.

This is the research for the answers to what Darwin never knew.

Darwin began his book office with questions about the rarer a child, and the many of his modern followers, including evolutionary biologist Sean Carroll.

SEAN B. CARROLL: A development has intrigued us perhaps the rarer was. Darwin were biologists did which was rather going out in the backyard or going to a zoo.

And anyone had a chance to take one step and look at relationships and science and frogs and things like that. And it was just fascinated with that profusion and adaptation.