

How do single cells become fully grown living beings?

How can studying cells help us treat or cure diseases?

Molecular biologists work to answer questions like these.



Julia Serano

Molecular Biology

Do you find it interesting to learn about the parts of a cell and how those parts work together as a system? Each organelle has a unique purpose. The nucleus of a cell, for example, is the command center of the cell. Every cell in the human body has a nucleus. The brain is the command center of your body, and the nucleus is the command center of the cell. All cells except mature blood cells contain other organelles, too.

The mitochondria turn the food you eat into energy your body can use. The cell membrane controls what passes into and out of a cell. Knowing how those parts of a cell work is important to molecular biologists. They examine what cells do, and how they do it, in order to answer big questions like: Can we use what we know to figure out how to cure disease?

Meet Dr. Julia Serano, who worked as a researcher for several years. Why did Dr. Serano pick molecular biology as her area of study? She says that learning *how* a cell forms into a specific cell types, like a skin cell, can help improve our understanding of diseases. Cancer, for example, forms when cells multiply at a very fast rate. If scientists understand how a specific type of cell grows, then they can create new treatments or even cures for diseases.

Some molecular biologists study diseases of the nervous system like ALS (Lou Gehrig's disease). ALS attacks the body's nerve cells. Over time, people with ALS can no longer control their voluntary muscles. Muscular dystrophy is another disease that affects muscles. It is caused by a gene mutation. The mutation prevents proteins from forming, so the body cannot build healthy muscles. Molecular biologists are interested in finding treatments or cures, but first they have to figure out how to study these kinds of diseases.

Scientists use different methods depending on the question they ask or the problem they are trying to solve. They choose methods depending on the data they need as evidence. Ethically, scientists cannot experiment on humans. So, one of the methods biologists use is to identify animals that have similar characteristics to humans. This is a way to collect data that scientists have agreed upon.

Dr. Serano studied fruit flies. It may seem strange that fruit flies are similar to people; however, Dr. Serano says, "the



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genes that help make legs or eyes or muscles ... in human beings are closely related to the ones that make those parts of mice and birds ... and fruit flies ” Fruit flies provided a model for studying individual cells.

Dr. Serano also studied mutations. Mutations in genes change an organism’s characteristics. Dr. Serano successfully identified a gene in fruit flies that she called “bitesize.” She found that the bitesize gene was responsible for reducing the size and number of cells in the animal. As a result, the fruit flies were smaller than normal. This work helped Dr. Serano learn more about how cells grow. And, her work helped inform the work of other scientists studying diseases.

In her career, Dr. Serano has been able to combine her love of science and the arts. *Bitesize* is the name of the gene she located, and it was the name of a band she once performed in as a guitarist and lyricist! As a transgender woman, Dr. Serano works today as an activist, writer, musician, and solo performer. Besides writing about her important work in science, she has also written about LGBTQ+ issues in a best-selling book of essays.

Works Cited

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