

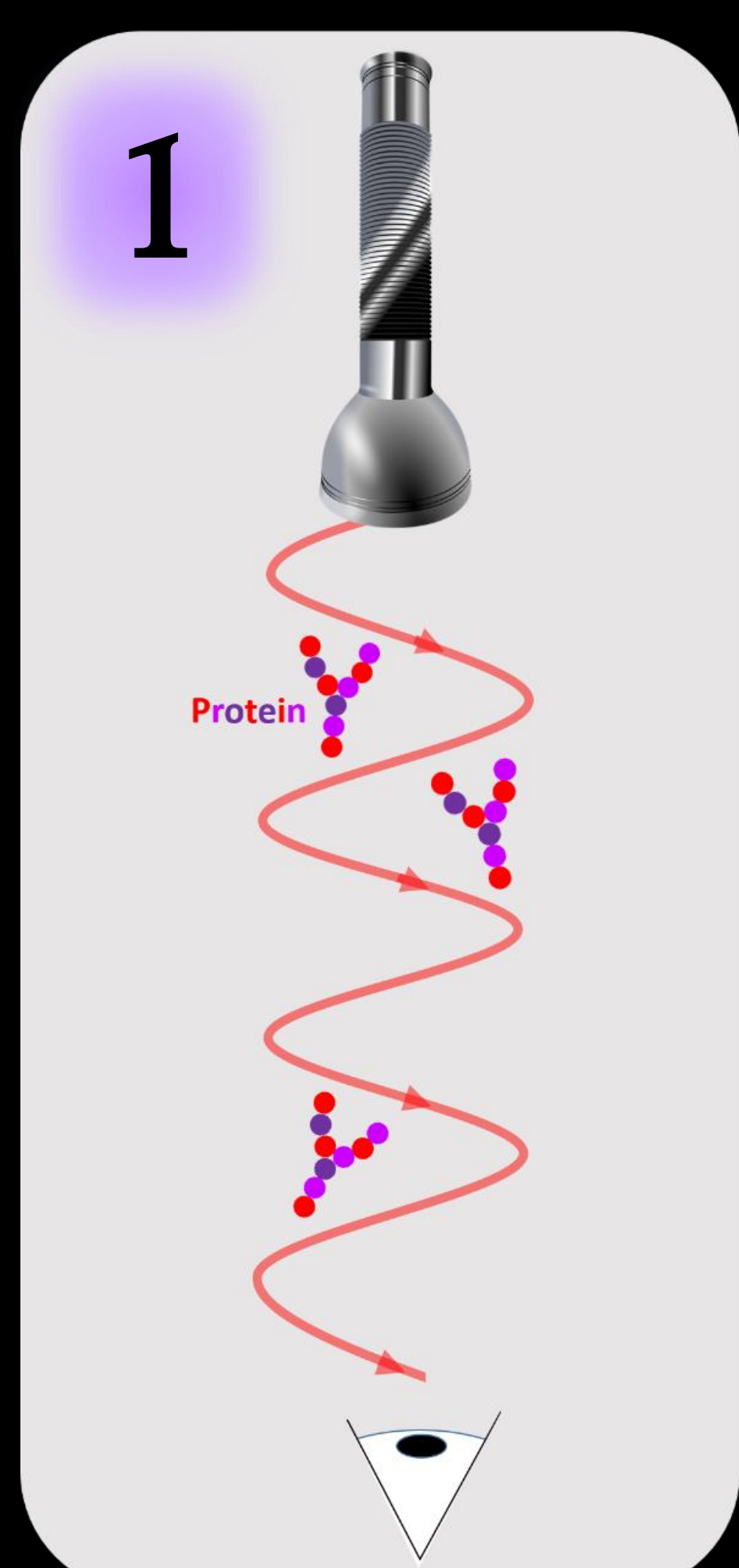
A 'Magnifying Glass' to Look at Proteins from Inside the Body

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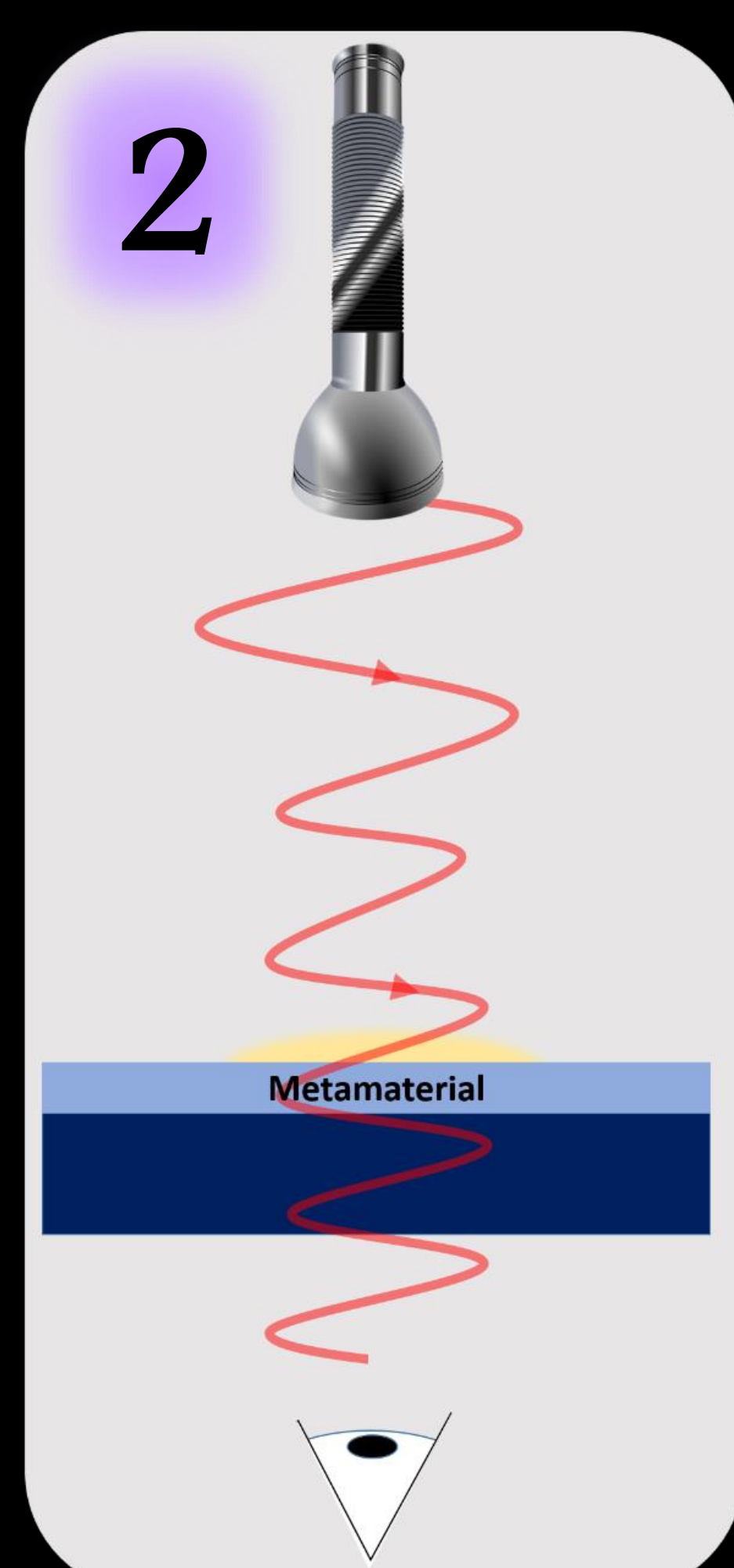
Abstract: The body uses proteins to build and repair tissue. Proteins are tiny molecules found inside all of our cells. However, they are really hard for scientists to look at, as they are so small. It would be useful to be able study proteins as they play a role in so many important bodily functions, including growth and digestion.

We hope to design a new way for scientists to study proteins using some unique material properties. This will help us to understand what the proteins are made up of and how they behave in different parts of the body.

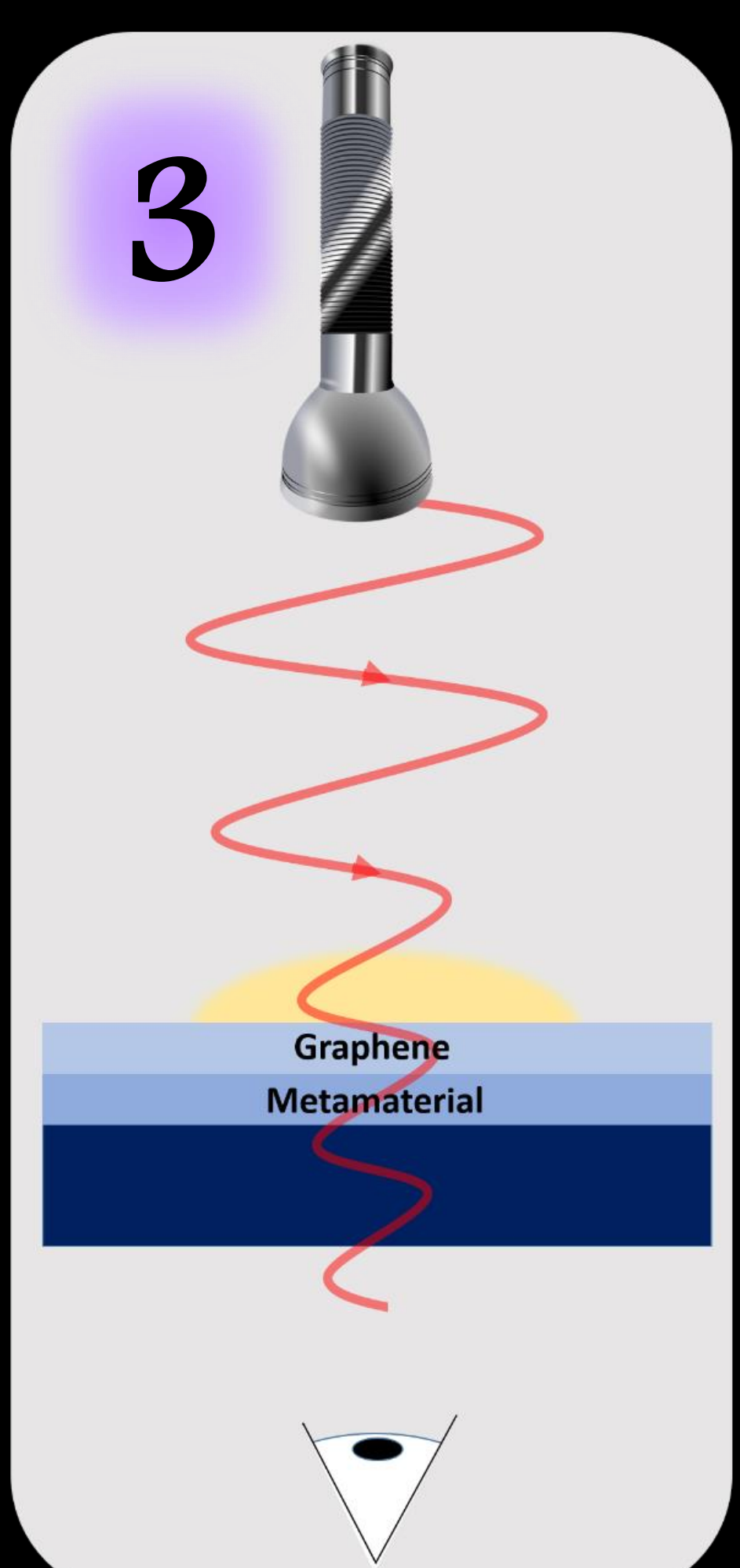
How does it work?



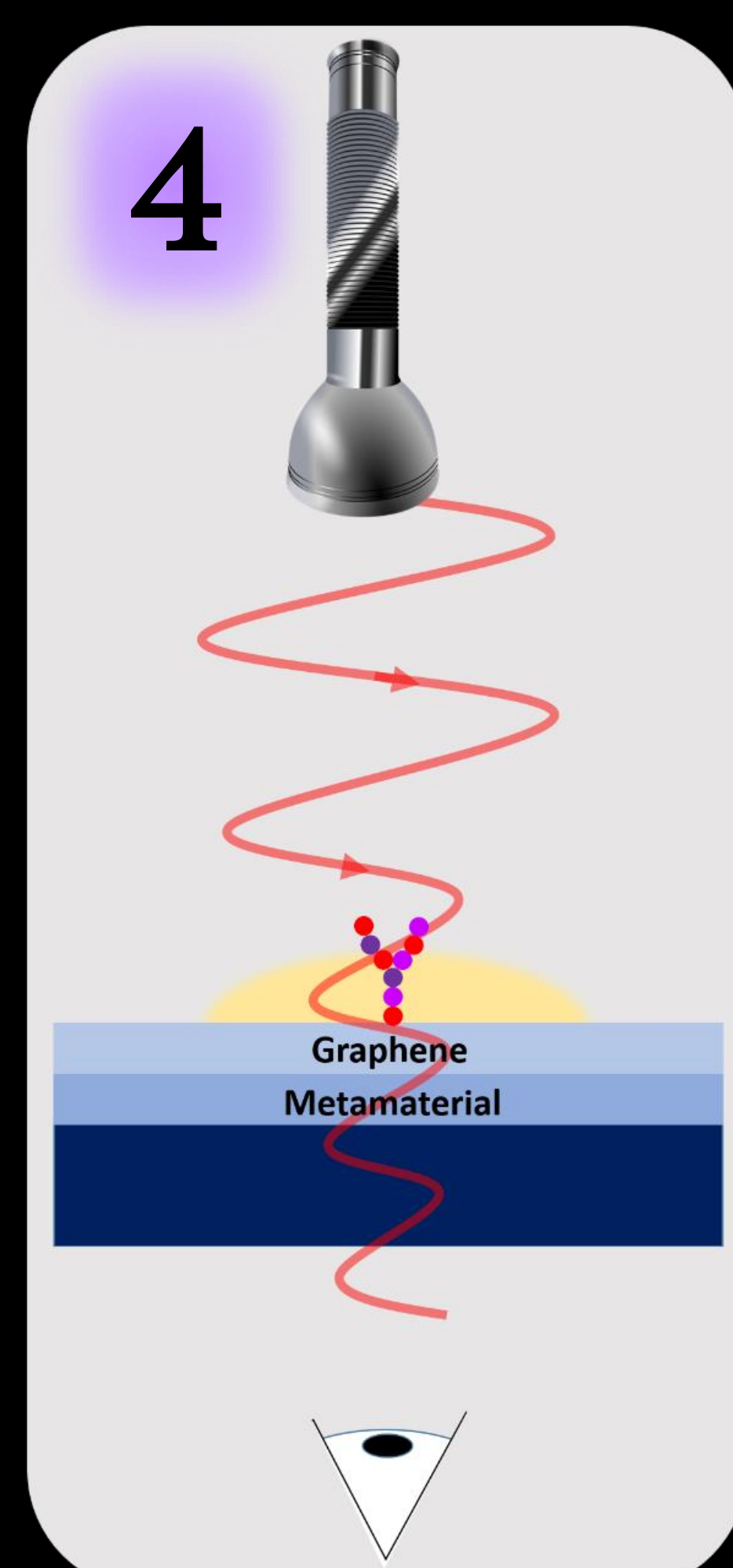
When using light to look at individual proteins we cannot see them because the light waves are too big and pass right by.



One way to overcome this is to design a 'metamaterial', a special metallic structure, that shrinks the length of the wave.



In order to shrink the light even further a structure made of graphene can also be added.



The resulting light wave is small enough to interact with individual protein molecules, making it easier for scientists to study them.

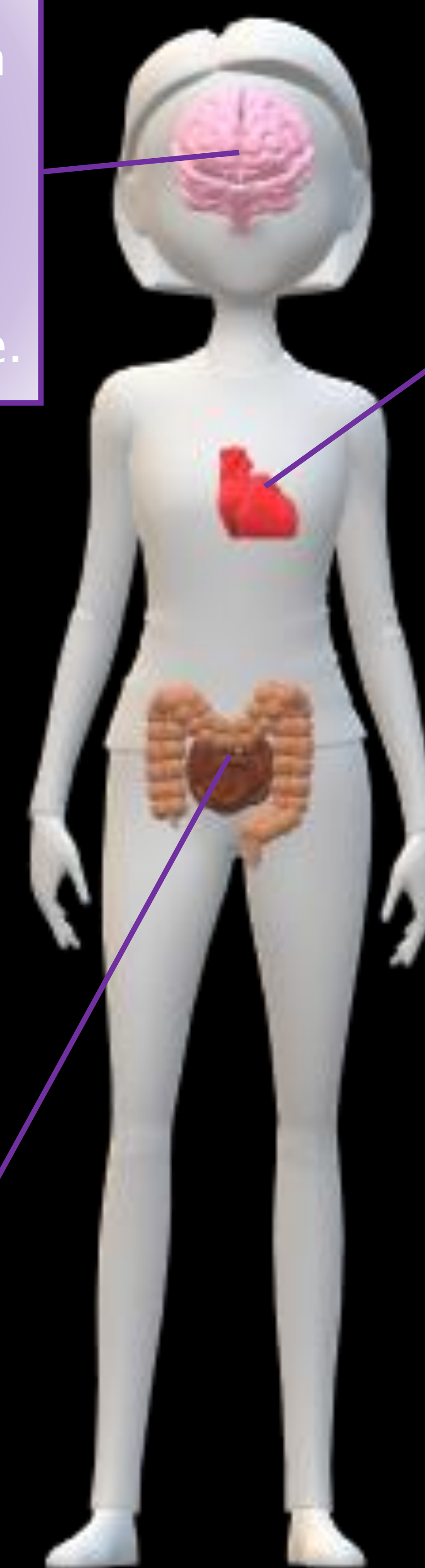
Why do we want to study proteins?

Proteins clump together in the brain causing Alzheimer's disease. Helping scientists to study these clumps could help them find a cure.

Sometimes proteins called Amyloids can cluster in the heart and other organs causing health problems. Understanding how could help scientists prevent this in the future.

Scientists are currently designing new drugs that tackle autoimmune diseases such as Inflammatory Bowel Disease. Being able to test individual drug molecules could speed up the design process.

New medicines to fight cancer are designed to mimic our own immune system. In order to do this, scientists need to be able to study antibodies from our bodies in detail.



Conclusions: Being able to study individual proteins, either from the inside the human body, or proteins designed and made by scientists in a laboratory, could help to better understand a wide range of human disease. In addition, it could help us to better understand the processes going on in every one of our cells, all day every day, keeping us fit and healthy.