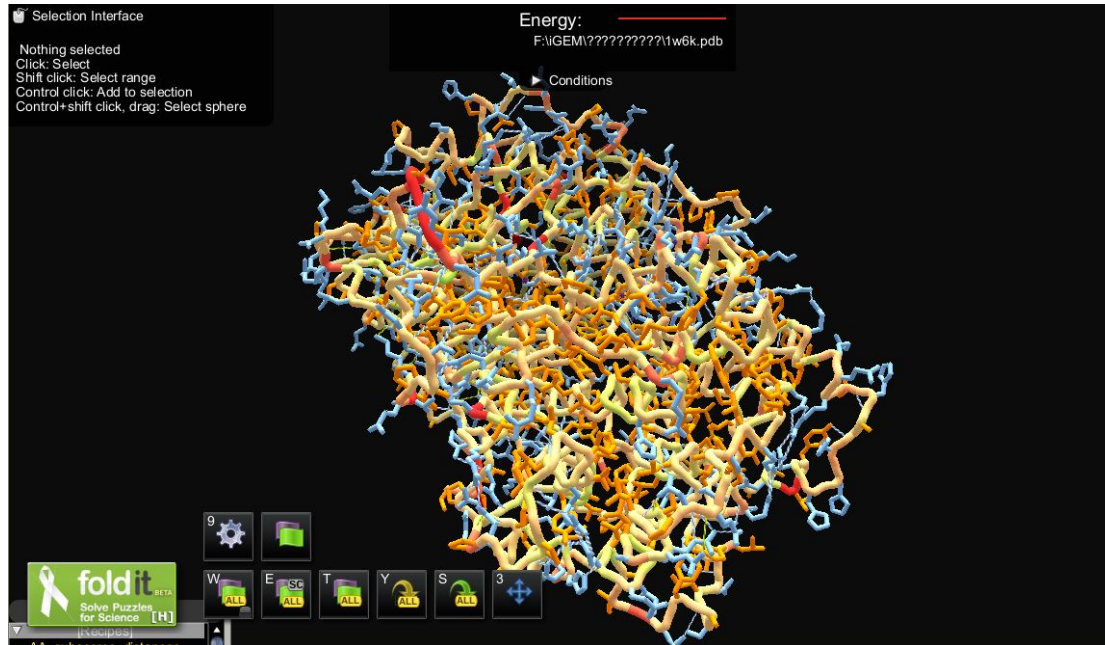


The goal of making this game is embedding science into game, to expand the accepting crowd of scientific knowledge. This game is Foldit. Foldit is a revolutionary crowdsourcing computer game enabling you to contribute to important scientific research. We can play this game using Pangu cyclase, which is designed by us. Next, I will introduce some information to you as follows.

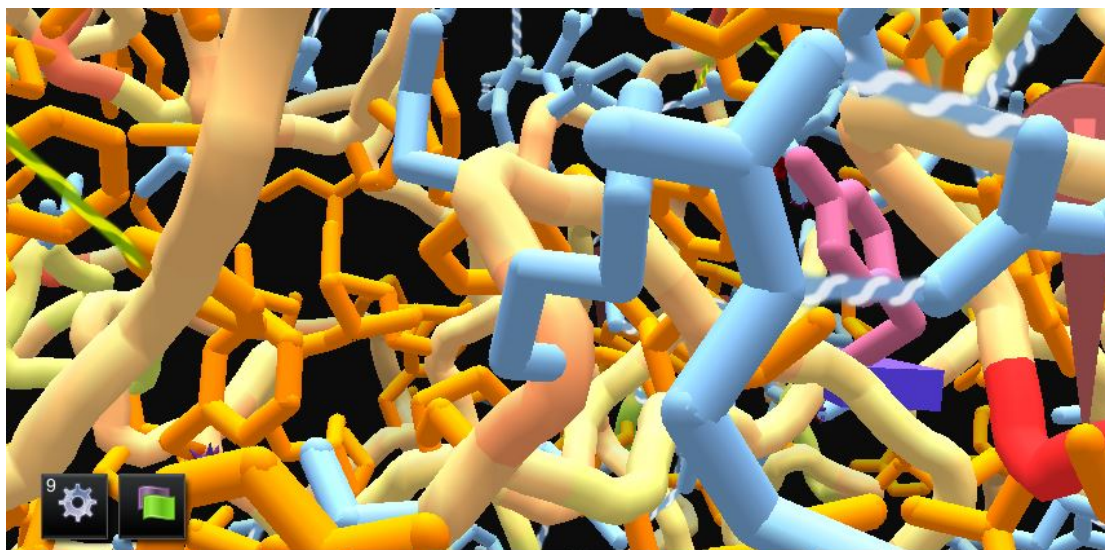


## What is protein folding?

**What is a protein?** Proteins are the workhorses in every cell of every living thing. Your body is made up of trillions of cells, of all different kinds: muscle cells, brain cells, blood cells, and more. Inside those cells, proteins are allowing your body to do what it does: break down food to power your muscles, send signals through your brain that control the body, and transport nutrients through your blood. Proteins come in thousands of different varieties, but they all have a lot in common. For instance, they're made of the same stuff: every protein consists of a long chain of joined-together amino acids.

**Why is shape important?** This structure specifies the function of the protein. For example, a protein that breaks down glucose so the cell can use the energy stored in the sugar will have a shape that recognizes the glucose and binds to it (like a lock and key) and chemically reactive amino acids that will react with the glucose and break it down to release the energy.

**What do proteins do?** Proteins are involved in almost all of the processes going on inside your body: they break down food to power your muscles, send signals through your brain that control the body, and transport nutrients through your blood. Many proteins act as enzymes, meaning they catalyze (speed up) chemical reactions that wouldn't take place otherwise. But other proteins power muscle contractions, or act as chemical messages inside the body, or hundreds of other things.



## Why is this game important?

### What big problems is this game tackling?

- **Protein structure prediction:** As described above, knowing the structure of a protein is key to understanding how it works and to targeting it with drugs.
- **Protein design:** Since proteins are part of so many diseases, they can also be part of the cure. Players can design brand new proteins that could help prevent or treat important diseases.

### How does my game playing contribute to curing diseases?

With all the things proteins do to keep our bodies functioning and healthy, they can be involved in disease in many different ways. The more we know about how certain proteins fold, the better new proteins we can design to combat the disease-related proteins and cure the diseases.

### Can humans really help computers fold proteins?

We're collecting data to find out if humans' pattern-recognition and puzzle-solving abilities make them more efficient than existing computer programs at pattern-folding tasks. If this turns out to be true, we can then teach human strategies to computers and fold proteins faster than ever!