

“Ant-Man” in *Xenopus* Oocyte

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For the Eureka!2016 Writing Competition

Lost a dream—

When the movie “Ant-Man” was widely showed and influenced all over the world. Almost all of us dreamed of becoming that man because we would be smaller but stronger supermen, and do whatever we want to... However, when time flies, it would be difficult to identify relative genes to create ant-man in reality. So I give up this dream and hope to become an ant-man in *Xenopus* Oocyte, discovering special proteins (from microorganisms like bacterial or green alga) for purpose of influencing movement in most kinds of organisms, including humans only using a certain wavelength of light (possible ~532 nm). This will have more chance to be realized in the future.

Phototaxis of green alga opens a new window to treat mammal diseases—

About ten years ago, my present supervisor Prof. Georg Nagel and his colleagues discovered the Channel rhodopsin2 which is a cation-selective ion channel binding with retinal which can be switched on by light. This opsin comes from *Clamydomonas reinhardtii* which have already been existed over 1 billion years. Light can open this channel and make it swim to the light by moving flagellar. This powerful tool tends to increase cytoplasmic Ca²⁺, depolarize cell membranes and transmit signalings among neurones, thus controlling actions of most mammals. It can possibly give methods to restore vision, hearing problem or Parkinson disease etc.

Searching for a beam of light from “God”—

To realize these purposes, there are still many problems to be solved. For one thing, we want to generate more useful optogenetic tools which can be used as red-shifted channels, because red light can penetrate more deeply and regulate certain tissues of mammals. For another, we make efforts to anchor channel or pump opsin in membranes of subcellular organelles like endoplasmic reticulum (ER) or mitochondrion. This will further have big effect on the physiology environment in alive cells, thus optimizing our living conditions by a beam of light.

Struggling for creating a new field in kingdom of plants—

Although a beam of light can be applied in regulating actions of mammals to make them release from pains, kingdom of plants are still looking forward to getting such welfare from the light because they also have some pains from drought, cold or manutrition etc. If some ion channels would be applied to optimize internal environment of plants, some of them could be more happy to grow more fruits for our humans or animals.

On the way to make fully use of light—

Light not only can be used in energy saving and emission reduction like solar power, making life survive, but also release some pains from some kinds of organisms. These kinds of comprehension open a new window for my PhD period, and I will make efforts to engineering potential tools to seek for application in certain fields. In this case, it seems that one field of scientific work is just like one emerging point of a circle, thus struggling for enlarging the border of it. This also looks like windows are made by “God” that many scientific workers want to see what they are outside. To be like “ant-men”, we not only could become ordinary people to see something in general, but also change into “smaller human” to search for more detailed solutions in many problems. And more exciting things will continue emerging from then on, thus making world more beautiful!!!