

FUBL-1: Helping to control the expression of genes through RNAi

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Multicellular organisms such as animals and plants are made up of various different cells which all contain identical DNA, but despite this the different cells can look and behave in very different ways. This is due to various processes of gene regulation, that control which genes are active in each cell. There are various processes of gene regulation which interact with each other, with other cells, and with the environment. One type of gene regulatory process is RNA interference (RNAi), where short RNA molecules identify specific messenger RNAs and prevent them from being translated into proteins. These short RNA molecules differ from mRNA molecules in that they are much shorter and they are not translated into proteins. RNAi can be used by scientists to prevent specific genes from being expressed and is therefore a very useful laboratory tool.

The nematode *Caenorhabditis elegans* (*C. elegans*) is a species of small (about 1 mm long) roundworm which is found in soil. Due to its ease of maintenance and simple structure, *C. elegans* is a popular animal model to study various processes in molecular biology. It is particularly important in RNAi research as RNAi was first discovered in *C. elegans*, and performing RNAi experiments on *C. elegans* is highly effective.

In this study, I have focused on FUBL-1, which is a protein found in *C. elegans* which is thought to play a role in RNAi in *C. elegans* germ cells (precursors to egg and sperm cells), with the aim of learning more about the role FUBL-1 plays in RNAi. I have used fluorescent labeled antibodies to label FUBL-1 in *C. elegans*, and then used microscopy to be able to see in which cells FUBL-1 is expressed. Through this I have confirmed that FUBL-1 is expressed in germ cells. FUBL-1 comes in three different forms: isoform a, isoform b and isoform c. Through the use of mutant *C. elegans* which lack specific isoforms but retain the others, I have found that the different isoforms may be redundant: that is, if one of the isoforms is lost, the other isoforms perform part of its role. Finally, I have made preparations to examine which RNAs FUBL-1 binds, which will help to reveal where in the RNAi process FUBL-1 is active.

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