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Expression profiles of cells and tissues in *C. elegans*

Status	Past
Competition	II
Sector	Health
Genome Centre	Genome British Columbia
Project Leader	David Baillie

Project Description

The Human Genome Project includes the study of hundreds of life forms in addition to mankind. Comparisons among these organisms allow scientists to determine which genes and life functions are common to all organisms and therefore which are most important for further research. Researchers can carry this idea one step further by concentrating their efforts on certain simple organisms that serve as stand-ins, or “models”, for studying basic life processes in humans and other complex animals.

We are experts in studies of a relatively simple worm called *C. elegans*. This animal is small, easy to work with, has only about 1,000 cells (compared to trillions in the human body), and its genetics and development are well understood—it is an ideal model. Our goal is to understand the biological workings of *C. elegans* by studying its thousands of different kinds of protein molecules: where they are located in the cell, how they interact with one another and what are the patterns of their expression in different animal tissues. We use genomic methods, such as sequential analysis of gene expression (SAGE), analysis of gene expression in live worms containing genes tagged with a fluorescent (glowing) protein, and protein identification using mass spectrometry.

We have completed 25 gene-expression libraries consisting of four million pieces of data from 17,000 genes, the largest collection of its kind for *C. elegans*. We have constructed over 2,000 different genes with fluorescent tags, allowing us to see their expression in living cells and tissue. We have identified the presence of over 4,000 proteins in the cells of embryonic, gut, skin, nervous system and other tissues. These experimental results are held in databases that we make freely available to researchers all over the world.

Fast Facts

<i>Highlighted outcome:</i>	Creation of resources and databases for genomic studies of <i>C. elegans</i>
<i>Number of research personnel employed by the project:</i>	33 plus 20 volunteers
<i>Number of peer reviewed publications published:</i>	19 publications, 21 invited talks, 1 book chapter
<i>Resources generated:</i>	Gene-expression libraries, a collection of proteins with fluorescent tags, identified over proteins in embryonic, gut, skin and nervous-system tissue, seven databases
<i>Co-funders:</i>	The Karloninska Institute, Sweden. We also collaborate in a total of 17 projects with groups funded by NIH (USA), MRC and Welcome foundation (UK), and CNRS and INSERM (France)