

GENOME from A1

flies looking for mutations and segregating them for the scientists to conduct further study.

In the nearly three decades she worked as a “fly girl”, she was surrounded by graduate students and post-doctorate scientists from around the world. She became a well-respected source for research continuity for the transitory graduate students and scientists who came and went.

“I was always around people who were smarter and more educated than I was,” Merryday said. “They were willing to teach me what they knew if I would help them learn what they needed to know as a new team member in the lab. They invited me to the weekly lab meetings as they discussed their current challenges and it was a rich learning environment for me.”

She said she became a keen observer and diligently carried out her responsibilities that were important to the success of the people around her. She read scientific journals

and discussed new scientific breakthroughs with her lab colleagues. She is grateful to a visiting scientist from Hungary who took the time to teach her the principles of genetics, which greatly enhanced her understanding of the significance of her work.

Merryday said 60 percent of the fruit fly’s DNA is homologous to humans. These shared common genes control the biological processes involved with growth and development. Surprisingly, nearly 75 percent of genes that cause disease in humans are also found in fruit flies, so it makes them good models to study human diseases.

She has a hefty book containing more than 100 years of scientific notes mapping fruit fly genetics and mutations since 1910. Their brief lifespans and their ability to reproduce quickly make them invaluable for scientists studying genetics and diseases.

A fruit fly breeds quickly and develops from egg to adult in less than two weeks. Females can lay up to 100 eggs in one day, making it possible to breed many generations cheap-

er and much faster than mammals such as mice. The fruit fly is a “model” for humans, allowing the investigation of the molecular mechanisms of at least 26 human diseases, including ALS.

“My constant job was to segregate the virgins for further study,” she said with a laugh. “I took a lot of photos from under my microscope of embryos stained with gene specific probes that were immediately uploaded to the internet and they are still online today.”

For decades, scientists knew human genes were spread across 23 pairs of chromosomes; however, under a microscope, the function of the wormlike structures was a scientific mystery.

In the late 1970s, scientists figured out how to identify a few individual human genes and decode their sequence, but it could take one’s entire career to locate a single gene.

Toward the end of the 20th century, an international network of geneticists decided to try to sequence all the DNA in the human chromosomes. The

Human Genome Project was an audacious undertaking, given how much there was to sequence.

Scientists knew that the twin strands of DNA in our cells contained roughly three billion pairs of letters — a text long enough to fill hundreds of books.

The scientific name for the fruit fly is *Drosophila melanogaster*.

Merryday said the highlight of her three decades in the UC Berkeley Fly Lab was working closely with Gerald Rubin. He was the scientist who led the federally-funded *Drosophila* Genome Project Group in the late 1990’s. Rubin’s data was shared with a private genetic research company that had powerful gene-sequencing machines and computers.

“Gerry was brilliant!” Merryday said. “We deliberately bred mutant flies to see how genetic variations affect development and behavior. Flies have 13,600 genes and humans have 24,000 genes. It took more than 100 years of research to genetically map the fruit fly and it would’ve taken even more to map the more complex human genome.”

The public/private partnership used the fruit fly data to teach the computers the physical maps they would need to eventually use as a reference to map the human genome.

In 2000, scientists announced the completion of the mapping of the fruit fly genome. At the time, geneticist Thomas Kornberg called the *drosophila* genetic sequence a “Rosetta stone” for the human genome.

Nearly 20 years after Rubin’s genetic project created the first draft sequence of the fly genome, last month, on July 26, the *New York Times* reported a team of 99 scientists has finalized the human genome. Their work filled in vast gaps and corrected a long list of errors in previous versions, giving us a new view of our DNA.

According to the *Times* story, the consortium’s six papers describing the full genome are under review by scientific journals. The researchers have uncovered more than 100 new genes that may be functional and have identified millions of genetic variations between people.

Some of those differences probably play a role in diseases.

For Nicolas Altemose, a postdoctoral researcher at the University of California, Berkeley, who worked on the team, the view of the complete human genome feels something like the close-up pictures of Pluto from the New Horizons space probe.

He said you could see every crater and color that for so long was just a blurry understanding. He described the breakthrough as “an absolute dream come true.”

For Amy Merryday, she is proud of the contributions she made to the foundational research conducted in her beloved Fly Lab that made this significant advance in science and medicine.

“The work I did was for the public good and my paycheck was written using grant-funded taxpayer dollars,” Merryday said. “It was a privilege to work with Gerry and all the other brilliant researchers in the Fly Lab for nearly 30 years.

“And I’m still in love with fruit flies!” she added.



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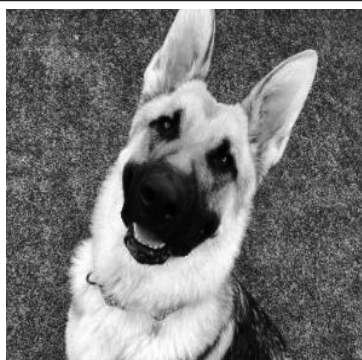
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