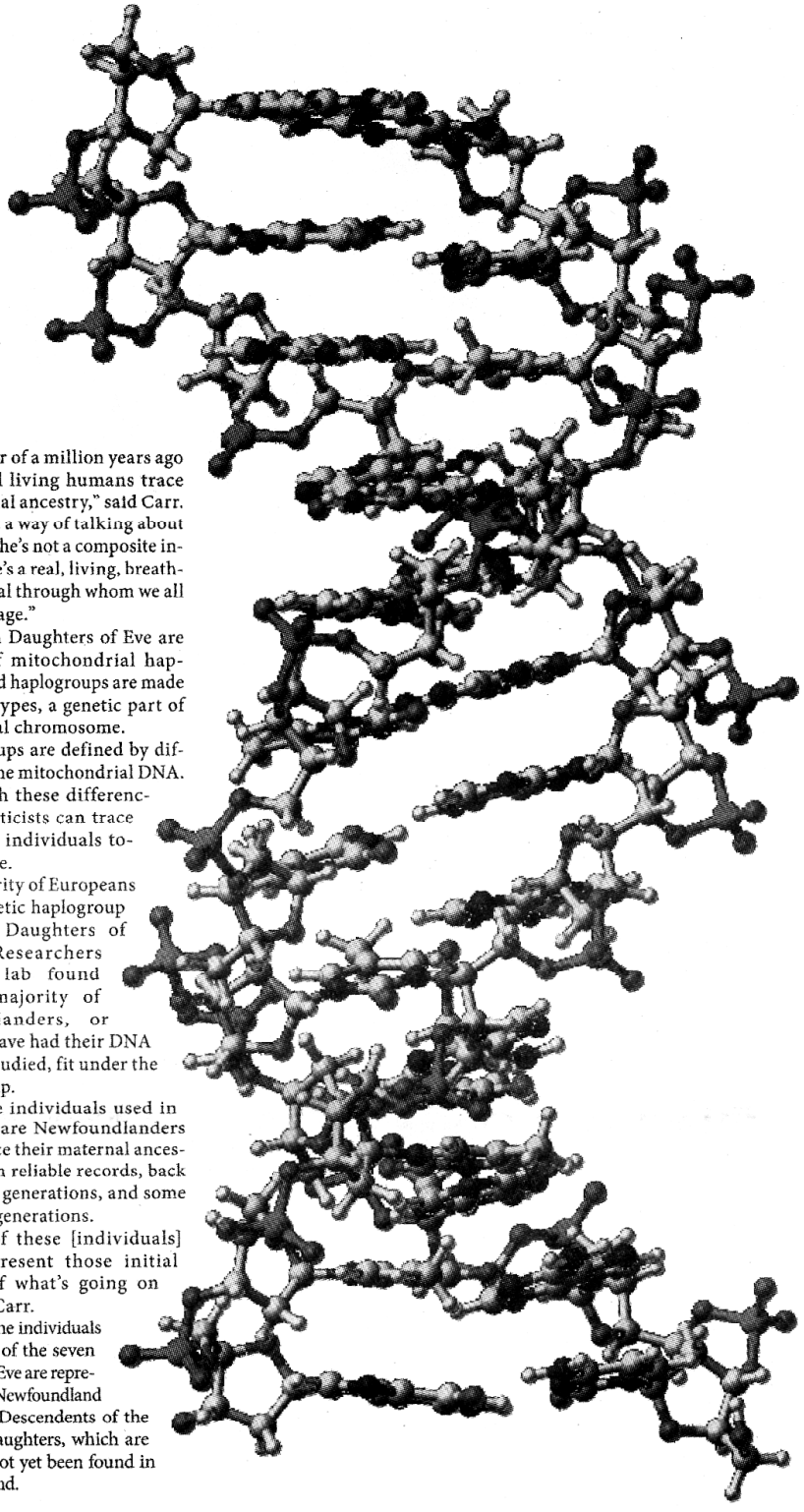
The Muse, Memorial University of Newfoundland, St. John's, 01 March 2007

NL population very diverse despite inbreeding: Study



BY JUANITA KING

The on-going joke and belief that Newfoundlanders are very closely related to one another is losing ground. According to research done at Memorial, humans worldwide are all related, but there is still sufficient genetic variation.

Most people assume that small populations, like Newfoundland's outports, lose genetic variation over time. But research done by Angela Pope, a master's of science student, shows this is not true.

"No two Newfoundlanders that we've ever looked at have the same genetic sequence; there is a great deal of variation," said MUN biology professor Steven Carr at a seminar last week called "Biotechnology for Biodiversity." Pope is a member of Carr's lab.

Newfoundland was colonized by a small number of families, coming mostly from the west country of England, southeast Ireland, and France. The island's present-day population comes primarily from these three sources.

Before the last few generations, Newfoundland was settled in small outport communities. These communities tended to be settled by only one religious or ethnic group, so there was limited genetic exchange between these people.

"When one hears the old idea that Newfoundlanders were inbred, that's trying to communicate in a very poor, inaccurate way, the idea that because these populations and communities are small, people must have been mating with their brothers and sisters," said Carr.

"That's not true," he said.

Geographic isolation and segregation of groups persisted only until the last couple of generations when breeding between groups such as Protestants and Catholics began to occur.

"The difficulty in the small community is that everyone tends to become related to everybody else over time and you may be marrying a cousin without knowing it, but there's certainly no intention to do that."

Because of this inbreeding, many people expect a loss of genetic diversity within Newfoundland's population.

But an analysis of mitochondrial DNA in the matrilineal descendants of the province's founders shows there is actually high levels of genetic diversity in the individuals.

Newfoundlanders descended from English settlers fall under three different major human lineages.

"There is not a loss of genetic variation, there [are] three different lineages represented," said Carr.

Those three lineages come from England, but there are also more lineages in Newfoundland that come from Ireland and France, as well as other areas.

This idea of major human lineages is tied into the Daughters of Eve theory. According to the theory, there are seven Daughters of Eve, or seven major human lineages that can be traced back maternally to the original ancestor of every living human today.

The original ancestor is known as Mitochondrial Eve; the mitochondrial DNA in everyone living today is derived from hers.

"She is the single historical person who lived in Africa something like a quarter of a million years ago to whom all living humans trace their maternal ancestry," said Carr. "So she's not a way of talking about something, she's not a composite individual. She's a real, living, breathing individual through whom we all share a passage."

The seven Daughters of Eve are made up of mitochondrial haplogroups, and haplogroups are made up of haplotypes, a genetic part of an individual chromosome.

Haplogroups are defined by differences in the mitochondrial DNA. It is through these differences that geneticists can trace from where individuals today originate.

The majority of Europeans are in a genetic haplogroup called the Daughters of Helena. Researchers in Carr's lab found that the majority of Newfoundlanders, or those who have had their DNA sequences studied, fit under the Helena group.

All of the individuals used in their study are Newfoundlanders who can trace their maternal ancestry, based on reliable records, back at least four generations, and some back seven generations.

"So all of these [individuals] should represent those initial founders of what's going on here," said Carr.

Through the individuals studied, five of the seven daughters of Eve are represented in the Newfoundland population. Descendents of the other two daughters, which are rarer, have not yet been found in Newfoundland.