

Saimaa ringed seal's reference genome to help with examining the genetics of populations

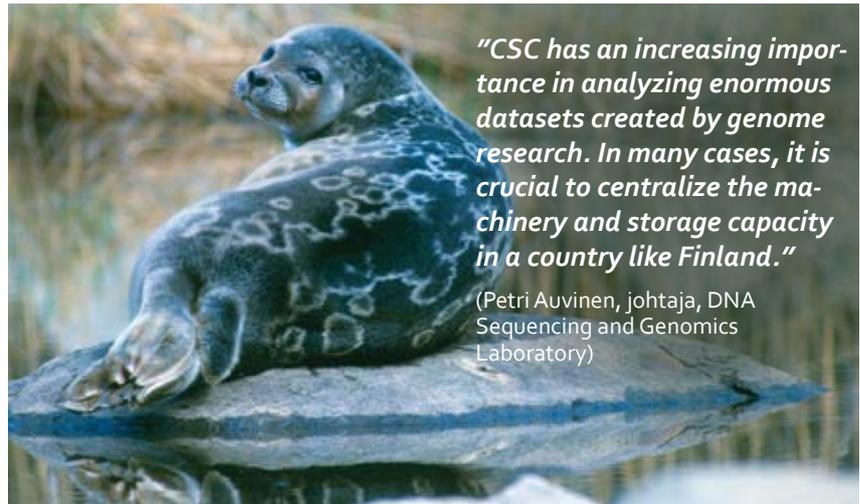
At the Institute of Biotechnology, Jukka Jernvall's and Petri Auvinen's research groups are examining the genome of different species and population structures. The aim is to understand when the species were born and separated from each other.

The DNA Sequencing and Genomics Lab of the Institute of Biotechnology is specialized in genome sequencing, or determining the base structure. The laboratory has sequenced the entire genome of several organisms, starting from the *Lactococcus piscium* bacteria, which ruins cold food. In addition, the laboratory is also researching gene expression by sequencing.

The reference genome is a digital sequencing database for the entire base sequence of one species, and in the case of the Saimaa ringed seal it has been assembled from one individual and in the case of humans from multiple genomes.

The rapid development of DNA sequencing techniques has enabled examining single nucleotide polymorphisms (SNP), which provides a very accurate estimate regarding the differences between individuals. This method is used also in the genome project for the Saimaa ringed seal. Collecting data requires a lot of storage space and computing power, which CSC – IT Center for Science Ltd. provides through the ELIXIR infrastructure.

Nowadays, there are also computational methods which can be used to deduce relative accurately from one single genome in what kind of population its ancestors have lived. The bottleneck phenomenon that populations may encounter means a situ-



"CSC has an increasing importance in analyzing enormous datasets created by genome research. In many cases, it is crucial to centralize the machinery and storage capacity in a country like Finland."

(Petri Auvinen, johtaja, DNA Sequencing and Genomics Laboratory)

Photo: Suomen Luonnonsuojeluliitto/Juha Taskinen

ation where a significant part of the population is destroyed or only a small number of individuals establishes a new group, for example the people who arrived in Finland in their time.

Examining the genetic history of the Saimaa ringed seal also helps with research

regarding the human genome. The bottlenecks may increase inbreeding, and thereby influence also disease heritage. In Finland, bottlenecks have created approximately forty hereditary diseases, which are significantly more common here than elsewhere in the world.

MORE INFORMATION:

DNA Sequencing and Genomics Laboratory

Laboratory is a part of the Institute of Biotechnology which is an independent research unit of the University of Helsinki. <http://www.biocenter.helsinki.fi/bi/dnagen/index.htm>

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<http://www.elixir-finland.org>

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