Glossary

Allan Wilson Centre for Molecular Ecology & Evolution is one of New Zealand's seven Centres of Research Excellence (CoRE). It was established in 2002 under the directorship of Mike Hendy and David Penny.

Recognised for its innovative and interdisciplinary research, the AWC is hosted by Massey University, and involves principle investigators from the University of Otago, University of Canterbury, Victoria University, Massey University, University of Auckland, and the New Zealand Institute for Plant & Food Research. In 2008, directorship of the AWC transferred to Paul Rainey, with Mike Steel as Deputy Director (http://www.allanwilsoncentre.ac.nz/about.htm).

Allopatric speciation, also known as geographic speciation, is the phenomenon whereby biological populations are physically isolated by an extrinsic barrier and evolve intrinsic (genetic) reproductive isolation, such that if the barrier breaks down, individuals of the populations can generally no longer interbreed

Clade is a grouping that includes a common ancestor and all the descendents (living and extinct) of that ancestor.

DNA (deoxyribonucleic acid) is a nucleic acid that contains the genetic instructions used in the development and functioning of all known living organisms and some viruses**.** The main role of DNA molecules is the long-term storage of information. DNA is often compared to a set of blueprints or a recipe, or a code, since it contains the instructions needed to construct other components of cells, such as proteins and RNA molecules.

cDNA (complementary DNA) is DNA synthesised from a mature mRNA template in a reaction catalysed by the enzyme reverse transcriptase.

mtDNA (Mitochondrial DNA) is the DNA located in organelles called mitochondria. Most other DNA present in eukaryotic organisms is found in the cell nucleus.

Hadamard conjugation, a mathematical relationship linking the parameters of evolutionary change on a phylogeny with patterns of nucleotide differences in the sequences evolving under a simple model.

Endosymbiont is an organism that lives within the body or cells of another organism.

Eukaryotes – organisms whose cells are organised into complex structures enclosed within membrane**s**. The defining membrane-bound structure that differentiates eukaryotic cells from prokaryotic cells is the nucleus.

Lapita is the common name of an ancient Pacific Ocean archaeological culture which is believed by many archaeologists to be the common ancestor of several cultures in Polynesia, Micronesia, and some areas of Melanesia.

Molecular clock. The molecular clock (based on the molecular clock hypothesis (MCH)) is a technique in molecular evolution to relate the time that two species diverged to the number of molecular differences measured between the species' DNA sequences or proteins. It is sometimes called a gene clock or evolutionary clock.

Molecular evolution is the process of evolution at the scale of DNA, RNA, and proteins.

PCR. The polymerase chain reaction (PCR) is a technique widely used in molecular biology. It derives its name from one of its key components, a DNA polymerase used to amplify a piece of DNA by *in vitro* enzymatic replication. As PCR progresses, the DNA generated is used as a template for replication. This sets in motion a chain reaction in which the DNA template is exponentially amplified. With PCR it is possible to amplify a single copy or a few copies of a piece of DNA across several orders of magnitude, generating millions or more copies of the DNA piece.

Phylogeny is the evolutionary relationships between groups of living things.

Phylogenetics is the study of evolutionary relatedness among various groups of organisms (e.g. species, populations), which is discovered through molecular sequencing data and morphological data matrices.

RNA (**ribonucleic acid**) is a molecule that consists of a long chain of nucleotide units. Each nucleotide consists of a nitrogenous base, a ribose sugar, and a phosphate. RNA is very similar to DNA, but differs in a few important structural details: in the cell, RNA is usually single-stranded, while DNA is usually double-stranded; RNA nucleotides contain ribose while DNA contains deoxyribose (a type of ribose that lacks one oxygen atom); and RNA has the base uracil rather than thymine that is present in DNA. The structure and base sequence of RNA are determinants of protein synthesis and the transmission of genetic information.

mRNA (messenger ribonucleic acid) is a molecule of RNA encoding a chemical 'blueprint' for a protein product. mRNA is transcribed from a DNA template.