Phylogenetic tree and horizontal gene transfer

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A universal phylogenetic tree in the other word is called evolutionary tree. From the word we can tells that it is about the relationship of evolution between various species of animal which represented in a branching diagram or tree-like diagram. The taxa which draw into the diagram are according to their similarities and differences in their physical and genetic materials. Animal at the tip of the tree are the modern animal we seen today. The tree is usually branched out from a common ancestor into different species due to environmental factor or gene mutation. So animal which are descended from a common ancestor will have some similar trait among them and this is called homology which can be in structure as well as gene sequence.

Horizontal gene transfer is also known as Lateral gene transfer (LGT) which means the genetic materials from one species are passed to another species without through the process of reproduction of offspring. This process is very common among bacteria even thought they are very distantly-related to each other. Lateral gene transfers allow the drug resistance among them increased very fast. This is because the gene that resistance to certain drug had acquired by one bacteria, it will then quickly this gene to the other bacteria and this process is goes on and on. Although two very distantly-related bacteria, but because of the bacteria are always changing genetic material with each other, a phylogenetic tree will also shows that they are closely related.

On the other hand, if the genetic material is passed on to next generation, which mean from parent to offspring, is called vertical gene transfer.

Genetic materials are passed on vertically from species 1 to species 2 and then species 2 passed to species 3 and so on hence called vertically gene transfer. But the genetic material of offspring also can be some different from their ancestor, this is because of mutation and also horizontal gene transfer between species.

Horizontal gene transfer

Darwin said that a species is diverged from an ancestor over a long time and through natural selection only then become the modern animal we saw now. But from the fossil record, around 545 million years ago, an explosive of diversification occur leading to apparent of a huge number of complex, multi-celled organisms. Large number of animals group appear very suddenly and most of them we still could found it today and known as Phylum which involved in the branches of the phylgenetic tree. Due to the natural selection, some animal which do not have the trait which are favourable to environment are extinct and we only can trace back with fossil record.

Before Cambrian explosion, there is only simplest form of organism or unicellular cell organism present, but because of the changing of environment factor, lead to the appearance of multi-cellular organism and other exoskeleton organism formed due to natural selection. Because of the shortage of oxygen present in the earth, animal doesn’t get enough oxygen for metabolic functions hence the increase of size of animal is inhibited. After Cambrian explosion, concentration of oxygen and water gradually accumulated, give rise to the present of large and complex animal. When the

Cambrian explosion started, there is an increasing of continental shelf, shallow seas produced and diversity of environment expanded. This phenomena occur is because of the supercontinent of Gondwana was breaking into smaller land masses which enable animal could specialize and cause variation between animals.

For those species which are still extant are undergoes different level of evolved over time. Some species maybe had evolved a lot but some maybe didn’t evolved much. The example of species that had evolved significantly is giraffe. The ancestor of giraffe is actually short neck. Beside giraffe, there are other animal also feed on the lower vegetation. As the time passed on, the lower vegetation become less and less. Because of the shortage of food, animals have to competing among themselves to survive, so giraffe started to obtain food from higher vegetation. This led to the evolution of giraffe where their neck becomes longer and longer over a long of time which enable giraffe to reached the higher branched of trees thus can obtain food hence survive hence there will be a branched in the tree of life for this species. Due to the environmental factor, special trait which doesn’t exist in ancestor of giraffe had generated and this distinct advantage is then passed on and on to their next generation hence a modern giraffe are appeared. Bridging the Gap Between Evolution and Faith (2009)

The other species which evolves a lot are dog. The ancestor of dog is actually grey wolf and in the other words, dog also called domesticated wolf. The significantly evolved of grey wolf to dog is also due to environmental factor. Wolf cubs were brought into human family by hunters and being trained by the hunter according their needs. Those pointless and dangerous

wolves will be killed and those with advisable trait wolf will be selected to breed. Gradually, their sense, ability and those characteristic of wild wolf will be change and also shrinking in size of teeth and overall size will reduces.

While on the other hand, there are also some species which doesn't evolve a lot, for example are crocodile. Usually, a species evolves is due to some changes of environment or to protect themselves from being eaten by other animal. But exclusive human, crocodile are considered on the top of food chain so they are not worry about being eaten by other animal. Crocodile are cold blooded reptiles so they had the environmental advantageous because their habitats can be in the water, swamp and also on land. This provides them many source of food. Hence, environment, source of food or habitats also give the advantageous for crocodile to survive, so they do not necessary to have a significantly changes.

For the exist of Tree of Life, I will stay neutral. The reason I choose neutral because I believe that the gene sequence is passed down from the ancestor. And as the gene pass down, there maybe will have some mutation or gene transfer from the other species hence cause variation in physical or gene sequence among the animal. But through the study genome of species, we can actually trace back their ancestor or where the species evolved from. Although some species may look very unalike but they maybe show the homology gene sequence hence we can know that they are actually came from a common ancestor. So I supported the tree of life do exist. While, because archaeologist had found some fossil evidence about Cambrian explosion which prove that around 545 million years ago only have multi-cellular organism appear and most of the animals are appear at the same

time. So this overturns the proved I mention just now that the species evolved from ancestor over a long period of time. Therefore, I choose to be neutral.