

## Basic Knowledge About Evolutionary Theory

### ● Let's Brush-up Basic Concepts: What is Evolution? What is Life?

- Evolution=accumulative change in hereditary traits
- Repeated warning→evolution ≠ progress
- What is 'heredity'? →replication(reproduction)
  - cf. Do flames reproduce?
- Consider life-related phenomena as dissipative structure

### ● Glossary of Evolutionary Theory (【 】 related terms)

- Gene: functional units of genetic codes. 【genome】
- Genotype and Phenotype: the former represents the sets of genetic information and the latter is product of these (could be substance or structure or function) cf. program and implementation results
- Replicator: pattern or entity that has capability of producing a replica, identical to self. cf. What is 'self'? What is 'identical'? What is that 'entity or pattern'?
- Species: Genes are given a range in their interactions to replicate (sexual reproduction). This range is the gene pool. Consider species as another name for gene pool. Other than for biological classification, it is not an effective concept. 【Darwin *The Origin of Species*, population thinking】
- Adaptation: Something that upgrades performance under a specific environment. In biological evolution this something is the gene.
- Selection: The driving force that puts into effect adaptive evolution. Selection occurs only when non-directional hereditary variation and discrepancy in environmental adaptation exist. Identical to trial and error. (natural selection, artificial selection) cf. Beware! Natural selection is often misunderstood for mutation.

### ● Bibliography

Hasegawa, Mariko. *What is Evolution*, Iwanami Junior Shinsho, 1999 (Excellent beginner's manual on evolutionary biology written in Japanese. Partially introduced in *Essays on the Theory of Evolution, an Anthology* edited by Sakura.)

E.F. Keller and E.A. Lloyd. (eds). 1992. *Keywords in Evolutionary Biology*. Harvard University Press, Cambridge, MA. Explanations of basic vocabulary, concepts as well as historical background and philosophical considerations.

※ Please refer to <http://park.ite.u-tokyo.ac.jp/sakuralab/main.htm> for further readings.