Preface

One of the short-term goals of the Human Genome Project is to produce libraries of largely contiguous, ordered sets of molecular clones for use in sequencing and gene mapping projects. This is planned to be done for the genomes of human and several model organisms such as yeasts, nematode, fruit fly, and mouse. Given a library of random clones, there are two major ordering schemes for building contigs (collections of overlapping clones). One is known as "fingerprinting"; the other is known as STS (sequence-tagged site) content-detection, or "anchoring". Two clones from the random clone library are considered linked if they share common fingerprints or common anchor sequences. Human genome has been thought to be a blueprint, but what type of blueprint has been a mystery. Human genome project was over in 2003, and seven years had already passed, but the number of human genes is still unknown. Analysis of human genomes has been continuously done, but the discussion that entails human genome as a blueprint has not been done. Far from that, any traces of a blueprint are not found in human genomes. This may be an evidence that human genome is not a blueprint.

The Watson-Click's DNA double helix is very beautiful; hence, life-scientists have imprinted that a human genome is a blueprint. If we hypothesize that a human genome is a blueprint, what types of absurdity would emerge? And if a human genome is not a blueprint, what must be needed to construct human bodies? To solve these hypothetical propositions are the aim of this document. In the case of unicellular organisms, such as E. coli, their genomes may play a role for blueprints. However, biological mechanisms of multicellular organisms such as Homo sapiens, are much complex and it is difficult to contain all information as a blueprint in their genomes. Therefore, a human genome plays a role for storage of genes and the study thinks that human oocytes have the instructions. However, a fertilized egg selects necessary genes from that storage and expresses genes for development and differentiation. Before fertilization, human oocytes express genes. If a human genome is a storage of genes, mRNAs which are important for development and differentiation must be expressed

in human oocytes and translated into proteins as soon as fertilization begins. Therefore, the study surveyed public databases and found an expression profile in human oocytes. In that profile, there are 12700 genes, and among these genes, more than 800 genes which are related to development and differentiation were found. In general, many sample data must be necessary for comparison of gene expression levels in statistical analysis; but in this case, the study does not need statistical analysis, because the importance is seen only in cases where certain types of genes are expressed in human oocytes. The homeodomain is an approximately 60 amino acid sequence containing many basic residues, and forms a helix-turn-helix structure that binds specific sites in DNA.

The homeodomain sequence itself is coded by a corresponding homeobox (HOX) in the gene. The homeobox was given its name because it was initially discovered in homeotic genes. However, there are many transcription factors that contain a homeodomain as their DNA-binding domain and although they are often involved in development, possession of a homeodomain does not guarantee a role in development, nor are mutants of homeobox genes necessarily homeotic. A very large number of homeodomain proteins have important functions, for example, engrailed in Drosophila segmentation, goosecoid in the vertebrate organizer and Cdx proteins in anteroposterior patterning. An important subset is the HOX proteins which have a special role in the control of anteroposterior pattern in animals. Homeobox genes are found in animals, plants and fungi, but the Hox subsets are only found in animals.

The book is designed for students and teachers of genetics, cell biology and biochemistry. These consider various genetic techniques that are useful in studying of this subject.

—Editor