Double rolling circle replication (DRCR): A mode of amplification of oncogene as well as drug-resistant genes and replication of HSV and chloroplast DNA

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It is well established that eukaryote nuclear chromosomes are duplicated from multiple origins of replication. It remains a mystery, however, how genomes of some viruses, such as HSV (Herpes simplex virus) and Baculovirus, or chloroplasts, are replicated. We have found recently that (i) double rolling circle replication (DRCR), originally found responsible for replication of yeast 2µ plasmid DNA, can lead to amplification of oncogenes as well as drug resistance genes, and (ii) that DRCR is highly recombinogenic. In addition, we will present our model, based on these findings, that DRCR is involved in DNA replication of HSV-1, chloroplasts and some mitochondria. The model could explain how DRCR contributes to replication-recombination coupling of HSV, and also how it promotes amplicon shortening during gene amplification.

Speaker Biography

Takashi Horiuchi has received his BS degree in 1969 from Department of Agriculture, Kyoto University, and Kyoto, Japan. He did his MS degree in 1971 from Department of Agriculture, Kyoto University and another MS degree in 1973 from Department of Science, Kyoto University. He completed his PhD degree in 1980 from Department of Science (Institute for Virus Research), Kyoto University. He received Kihara Prize for "Identification and characterization of DNA replication fork blocking event".

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