

## **General Summary of Division of Cell Biology**

In the past three years the division has been dedicated to basic researches on new RNA functions, biogenesis of liver-specific microRNA, miR-122 and function of hemocytes in ascidians.

### **A) Biogenesis of liver-specific microRNA, miR-122.**

miR-122 is a liver-specific and highly abundant miRNA implicated in cholesterol and lipid metabolism and in replication of HCV. Interestingly miR-122 is down-regulated in HCCs as well as hepatoma cell lines. It suggests that the downregulation of miR-122 is associated with hepatocarcinogenesis. Therefore we have studied about the miR-122 gene and its expression.

Human miR-122 gene is about 5kb and transcribed at least 4 alternatively spliced forms as non-coding and exonic pri-miR-122 RNA. Transcription of miR-122 gene is stimulated by three liver abundant transcriptional factors HNF3b, C/EBP $\beta$  and unknown factor that interact at 200base upstream from transcription initiation site. Expression of miR-122 gene was strongly stimulated by promoter-proxymal splicing event.

### **B) Functional analysis of a non-coding small RNA involved in acetylation of 18S ribosomal RNA.**

Many non-coding RNA species are involved in transcriptional and post-transcriptional regulation of gene expression. Among hundreds of known non-coding RNAs localized in nucleoli, U13 snoRNA is the first RNA involved in 4-acetylcytidine modification in the 3' -end region of 18S ribosomal RNA. We are currently interested in the structure required for the biogenesis and target recognition of U13 snoRNA. Various mutant RNAs have been expressed in a U13 gene-knockout DT40 cell line and their acetylation activities have been assayed.

### **C) Function of hemocytes in ascidians**

Ascidians have no adaptive immunity but have innate immunity that allows elimination and degradation of potentially pathogenic foreign microorganisms. Phagocytosis by hemocytes is a major effector system of the innate immunity. Our knowledge on the ascidian phagocytes is still fragmentary and sometimes conflicting. Therefore the hemocytes with phagocytic capacity was studied in the ascidians. It was firstly shown that four types of hemocytes have phagocytic capacity in *Ciona intestinalis*. The high phagocytosis rate possibly assists to investigate the function of ascidian hemocytes in the future.