

Functional Genomics

1. Staffs and Students (2009)

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2. Research Interests

Recent whole genome sequence analyses revealed that a high degree of proteomic complexity is achieved with a limited number of genes. This surprising finding underscores the importance of alternative splicing, through which a single gene can generate structurally and functionally distinct protein isoforms. Based on genome wide analysis, 75% of human genes are thought to encode at least two alternatively spliced isoforms. The regulation of splice site usage, so called "splicing code" provides a versatile mechanism for controlling gene expression and for the generation of proteome diversity. Thus splicing code may play essential roles in many biological processes, such as embryonic development, cell growth, and apoptosis.

3. Research Subjects

- 1) A Transgenic Reporter Worm System Offers a Path to Alternative Splicing Codes *in vivo*.
- 2) Regulating Mechanism of Alternative Splicing and its Physiological Function during the Development of Mouse Brain
- 3) mRNA Splicing Regulation and Virus Infection.
- 4) Development of Novel Specific Inhibitors of "PSYCHIK" Family Kinases and their Potentials as Pharmaceutical Drugs
- 5) mRNA splicing regulation and stress response

4. Publications

Original articles

1. Nojima T, Oshiro-Ideue T, Nakanoya H, Kawamura H, Morimoto M, Kawaguchi Y, Kataoka N and Hagiwara M (2009) Herpesvirus protein ICP27 switches PML isoform by altering mRNA splicing *Nucleic. Acids Res.* Oct;37(19):6515-27
2. Jiang K, Patel NA, Watson JE, Apostolatos H, Kleiman E, Hanson O, Hagiwara M, Cooper DR. (2009) Akt2 regulation of Cdc2-like kinases (Clk/Sty), serine/arginine-rich (SR) protein phosphorylation, and insulin-induced alternative splicing of PKC δ mRNA. *Endocrinology* 2009 May;150(5):2087-97

Review article

1. Hidehito Kuroyanagi. (2009) Fox-1 family of RNA-binding proteins. *Cellular and Molecular Life Sciences* 66:3895-3907.