Inorganic pyrophosphatase (PYP-1) plays an essential role in larval intestinal development in C. elegans

Kyung Min Ko, Wonhae Lee, Kalichamy Karunanagamii, and Joohong Ahnh
Dept. of Life Science, Gwangju Institute of Science and Technology (GIST), Gwangju 500-712

Recently, many comparative proteome studies have identified cancer-related proteins whose expression levels are significantly altered in various cancers. One of the most up-regulated proteins in cancer is the inorganic pyrophosphatase (PYPase). PYPase catalyzes the hydrolysis of inorganic pyrophosphate (PPI) into orthophosphate (Pi). It has been proposed that catalysis of PYPase is a thermodynamic driving force for a number of important biosynthetic reactions. However, the in vivo functions of PYPase are yet to be elucidated. Here we assess the functions of the PYP-1 using a deletion mutant (ppy-1(h1223)) of C. elegans. C. elegans PYPase (CePYP-1) found to be overexpressed in the intestine and hyperphosphorylated in the depletion mutant (ppy-1(h1223)) revealed a developmentally arrest phenotype at L2 stage, and larval intestinal phenotype at L3 stage. These data suggest that PYP-1 has a crucial role in the intestinal development in C. elegans.

Inhibition of nitric oxide and tumor necrosis factor-alpha by Moutan Cortex in activated mouse peritoneal macrophages

Hwan-Suck Chung1, Moonkyu Kang1, Chongwoon Cho1, Jye-Yoon Kim2, Na-Youn Lee1, Cheong-heong Park1, Dongwoo Kim3, Joonghwahn Oh4, Hongyeol Kim5, Minkyu Shin6, Moochang Hong7, Yangseok Kim8, Hyunsu Bae1,4
1Purimed R&D Institute, Kyung Hee University, Seoul, 2Department of Internal Medicine, College of Oriental Medicine, Kyung Hee University, #1 Hodong-Dong, Dongdam-gu, Seoul, 3Department of Physiology, College of Oriental Medicine, Kyung Hee University, #1 Hodong-Dong, Dongdam-gu, Seoul

Moutan Cortex (MC), is one of the most widely used Oriental herbal medicines for treating inflammatory diseases. In this study, the effect of MC on lipopolysaccharide (LPS) and recombinant interferon-gamma (rIFN-γ)-induced production of nitric oxide (NO) and tumor necrosis factor (TNF-α) was examined using mouse peritoneal macrophages. MC inhibited the LPS/rIFN-γ-induced expression of inducible nitric oxide synthase (iNOS) and TNF-α release. To clarify the mechanism involved, the effect of MC on the activation of nuclear factor (NF)-κB was examined. The LPS/rIFN-γ-induced activation of NF-κB was almost completely blocked by MC at 0.5 μg/ml. These findings demonstrate that the inhibition of the LPS/rIFN-γ-induced production of NO and TNF-α by MC is due to the inhibition of NF-κB activation.

Jagged-mediated notch signaling maintains proliferating neural progenitors and regulates cell diversity in the ventral spinal cord

Sang-Yeo Ye1, MinJung Kim2, Tae-Lin Huh1, Ayaj B. Chitnis1
1Department of Genetic Engineering, Kyungpook National University, Daegu, 702-701, Korea, 2Department of Neurosurgery, College of Medicine, Dongsan Medical College, Chungbuk 360-714, Korea

Previous studies have shown that Delta-mediated Notch signaling regulates the number of early differentiating neurons. However, the role of Notch activation and Jagged-mediated signaling during late neurogenesis remains poorly defined. Here we investigate how Jagged-mediated Notch signaling is involved in the maintenance of proliferating neural progenitors. In the developing spinal cord of zebrafish, GABAergic KA cells and motor neurons emerge sequentially from their progenitors in the p3 domain. Jagged2 is expressed uniformly in the pMN domain during late neurogenesis where Cks2 is required for its expression. It interacts ventrally with progenitors in the adjacent p3 domain, where it has a critical role in the maintenance of proliferating neural progenitors and in preventing premature differentiation of these progenitors as GABAergic KA cells. Jagged2 also limits the number of secondary motor neurons, both within the pMN domain, where it is expressed, and in the p3 domain, where it prevents a late differentiating population of motor neurons from prematurely differentiating till about two days of development. To differentiate to motor neurons during late neurogenesis, a progenitor in p3 domain requires the regulation of Jagged in pMN domain by Mind point as an E3 ubiquitin ligase which interacts with Jagged2 to promote its ubiquitination and degradation. This study identifies a critical role for Jagged-Notch signaling in the maintenance of proliferating neural precursors in a discrete compartment of the neural tube during the continuing growth and development of the vertebrate nervous system.