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XRyk is required for Wnt signaling pathway in embryonic development in Xenopus laevis

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Wnt pathway plays a central role in embryonic development. Canonical Wnt pathway is essential for the establishment of organizer and embryonic body axis and PCP pathway regulates convergence and extension (CE) movements during gastrulation in Xenopus laevis. Wnt ligands, receptor frizzled and coreceptor such as LRP5/6 are involved in this pathway. Recently, study of mammaliam Ryk uncovered that Ryk is a Wnt coreceptor required for neurite outgrowth. XRyk is an atypical receptor tyrosine kinase but has no kinase activity. However, the molecular mechanisms of Wnt pathway through Ryk are poorly understood. In this study, we analyzed the function of XRyk in Wnt pathway. First, knockdown of XRyk reduces siamois promoter activity induced by XWnt8, inhibits the formation of a secondary axis by XWnt8, and rescues the headless phenotype by XWnt8. These data indicate that XRyk is required for canonical Wnt pahtway. Second, gain and loss of function of XRyk has defects in CE movements and XRyk can signal to dishevelled, RhoA and JNK which are components of PCP pathway. These data indicate that XRyk is a component of PCP pathway. Taken together, we suggest that XRyk functions as a novel regulator in canonical Wnt pathway and PCP pathway during embryonic development in

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Stimulation of Oct-4 Activity by Ewing's Sarcoma Protein EWS

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Oct-4, also referred to as Oct-3, functions as a master switch during differentiation by regulating cells that have pluripotent potential or can develop such potential. Oct-4 is a member of the POU family of transcription factors, which is expressed in pluripotent embryonic stem and germ cells. Oct-4 activates transcription via octamer motifs located proximally or distally from transcriptional start sites. To be active from distal sites, Oct-4 requires stem cell-specific bridging factors that links an Oct-4 molecule bound to a remote DNA region to the transcription initiation site. In order to identify cofactor that physically interacts and potentially cooperates with Oct-4 in allowing cells to remain in the cycle of pluripotency, we conducted a bacterial two-hybrid screen of an ES cell cDNA library using Oct-4 as bait. We found EWS to be a binding partner of Oct-4. We confirmed that EWS interacted with Oct-4 in vitro and in vivo.Oct-4 and EWS were co-expressed in the pluripotent mouse and human embryonic stem cells. Consistent with its ability to bind to and colocalize with Oct-4, ectopic expression of EWS enhanced the transactivation ability of Oct-4. These data indicate that transcriptional activity of Oct-4 is modulated by EWS.

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cMAP-response element-binding protein is not essential for osteoclastogenesis induced by receptor activator of NF-kB ligand

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Osteoclasts are multinucleated cells with bone resorbing activity and differentiated from hematopoietic cell lineages of monocyte/macrophages in the presence of receptor activator of NF-B ligand (RANKL) and M-CSF. However, the exact molecular mechanisms through which RANKL stimulates osteoclastogenesis remain to be elucidated. Here we report that activation of cAMP-response element-binding protein (CREB) is not involved in osteoclastogenesis from osteoclast precursors in response to RANKL. RANKL induced CREB activation in osteoclast precursors. Using pharmacological inhibitors, we found that RANKL-induced CREB activation is dependent on p38 MAPK pathways. We also found that ectopic expressions of wild type and dominant negative forms of CREB in osteoclast precursors did not affect RANKL-induced osteoclast formation and bone resorbing activity. Furthermore, dominant negative forms of CREB did not alter the expression levels of osteoclast-specific marker genes. Taken together, these data suggest that CREB is dispensablefor differentiation and resorbing activity of osteoclasts.

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Proteomic analysis of developing pancreas of domestic pigs

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The prevalence of diabetes for all people worldwide was estimated to be 2.8% in 2000 and 4.4% in 2030 from 171 million to 366 million due to populationgrowth, aging, urbanization, and increasing prevalence of obesity and physical inactivity. Addition, for the treatment of pancreas-related disease such as pancreatitis and pancreatic cancer, it is particularly important to study the biology and molecular characteristics of pancreas in order to discover different possibilities of preventive and effective treatment. A few proteomic researches have been carried out using human pancreatic tissues to elucidate the mechanisms of diabetes and pancreatic cancers because of difficulty in preparing the sample. And several studies contribute to better understand the molecular network governing developing pancreas in animal models such as mouse and rat. Recently pig pancreas has been noticed because of its significant possibility for xenotransplantation. However it has been not fully reported to that expressed proteins of pancreas. We employed two-dimensional gel electrophoresis (2-DE) and mass spectrometry (MS) to identify expressed protein profiles of pig pancreas based on developmental stages from gestation 60th day, neonatal and 6 month-old. Two hundreds eighty nine proteins were detected and 52 proteins were identified from 6 month-old pig pancreas. Among them 47 proteins were differentiallly expressed based on developmental stages. Twenty two proteins were highly expressed, 16 proteins decreased at neonatal stage compared with 6 month-old. The highly expressed proteins at fetal stage were alpha-1-antitrypsin, alpha-fetoprotein, transferrins and almost digestive enzymes like trypsin, pancreatic triacylglycerol lipase and pancreatic alpha-amylase. However at prenatal stage, instead of trypsin, chymotrypsins are highly expressed. In this study, we found out that several proteins were significantly up or down regulated from pig pancreas based on developmental stage. We may suggest that these proteins may have certain roles in the differentiation and developmental of pig pancreas. To our knowledge, this is the first report about the proteome of developing pig pancreas.