



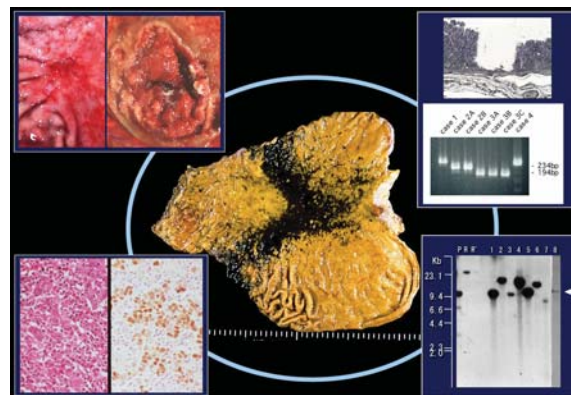
Pathology, Immunology and Microbiology

Pathology and Diagnostic Pathology

http://pathol.umin.ac.jp/index_e.htm

We investigate the pathogenesis and pathobiology of disease, especially the neoplastic diseases, by means of morphology. Our goal is to discover new entities and to clarify unknown pathogenesis of diseases through the interaction with clinical medicine.

- Chronic inflammation and neoplasm
 - Epstein-Barr virus associated gastric carcinoma
 - Epigenetics of carcinoma
 - Carcinoma-stromal interaction
 - Lung adenocarcinoma and its scar formation
 - Lung fibrosis and adenocarcinoma
- Application of molecular pathology to pathological diagnosis
 - Discovery of cancer therapy target by DNA chip technology
 - Establishment of objective criteria for cancer grading
 - Streamlining and acceleration of pathological diagnostic processes



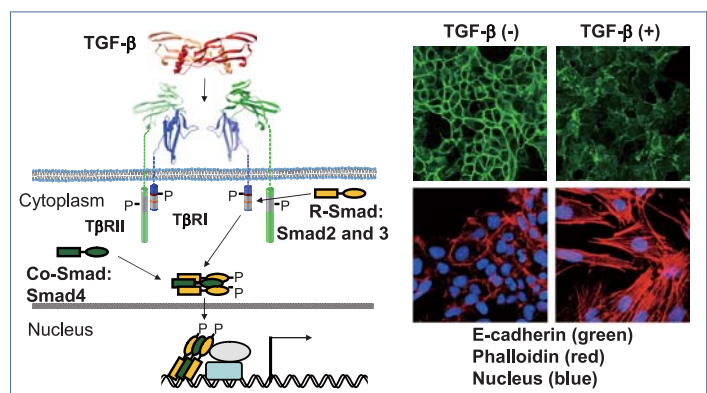
Investigation of the development of EB virus-associated gastric carcinoma

Molecular Pathology

<http://beta-lab.umin.ac.jp/index.htm>

Our research is focused on the molecular mechanisms of carcinogenesis. We study the signaling mechanisms of the TGF- β superfamily, including TGF- β and bone morphogenetic proteins (BMPs), and elucidate how they regulate progression of cancers. We also investigate the mechanisms of differentiation of murine embryonic stem cells (ESCs) into various cells, including vascular and lymphatic endothelial cells. Based on these findings, we will develop new strategies for the treatment of vascular and lymphatic diseases and cancer.

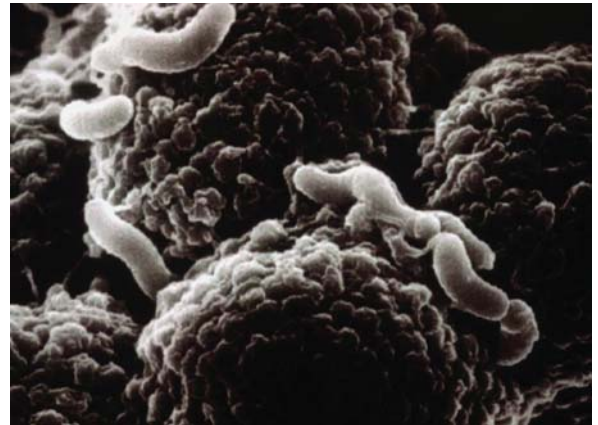
- Molecular mechanisms of growth regulation by TGF- β
- Roles of TGF- β in epithelial-to-mesenchymal transition
- Negative regulation of TGF- β signaling by inhibitory Smads and oncogene c-Ski
- Differentiation of mouse ESCs into vascular cells
- Roles of TGF- β superfamily cytokines in vascular and lymphatic diseases
- Differentiation of vascular and lymphatic endothelial cells and mechanisms of diseases



Signaling by TGF- β (left) and TGF- β -mediated EMT of mammary epithelial cells (right)

Our major objective is to elucidate molecular mechanisms underlying development of gastric carcinoma triggered by infection with *Helicobacter pylori*. Based on the results obtained from these studies, we are also developing new strategies for prevention and treatment of infection/inflammation-associated cancers, which account for ~ 50% of entire human malignancies.

- Structural biological analysis of *H. pylori* oncoprotein CagA
- Intracellular signaling pathways targeted by CagA
- Mouse genetic studies on gastric carcinogenesis
- Host genetic factors determining gastric cancer susceptibility
- Molecular mechanisms linking inflammation and cancer



H. pylori - gastric epithelial cell interaction

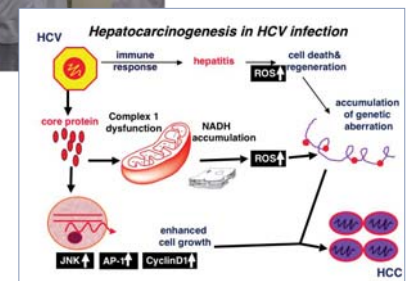
Infection Control and Prevention

We are engaged in education of medical staff as well as in daily clinical activities on the prevention of healthcare-associated infection (HAI). Research activities on the pathogenesis of infection with hepatitis viruses and HIV, in particular, on the mechanism of hepatocarcinogenesis in HCV infection are also our mission.

- Development of preemptive strategies for the control of healthcare-associated infection
- Development of new methods in infection control and treatment of viral hepatitis
- Molecular pathogenesis of hepatocellular carcinoma in HCV infection
- Pathogenesis of progression of HIV infection
- Molecular pathogenesis of the mitochondrial disturbances in viral infections
- Molecular pathogenesis of hepatitis B viral infection
- Host defences to microorganisms
- Molecular analysis of innate immunity in microorganism infection
- New detection method and pathogenesis of opportunistic cytomegaloviral infection
- Mechanism of multi-drug resistant microorganisms



Infection control team rounds



Immunology

Since its initial identification of the genes for interferon (IFN)- β and interleukin (IL)-2, our laboratory has continued to elucidate the signal transduction and transcriptional regulatory networks involved in immunity and oncogenesis.

- The signaling and transcriptional networks that operate in the regulation of and by IFN- α/β during innate immune responses,
- The role and regulation of the interferon regulatory factor (IRF) transcription factor family in innate and adaptive immune responses,
- The regulation of dendritic cell maturation/activation in the link between innate and adaptive immunities,
- The molecular mechanisms of protective and pathological immune responses mediated by nucleic acid sensor proteins,
- The regulation of oncogenesis by IRFs,
- The regulation of mucosal immune responses.



Intracellular localization pattern of DAI (DLM-1/ZBP1) and its interaction with B-DNA