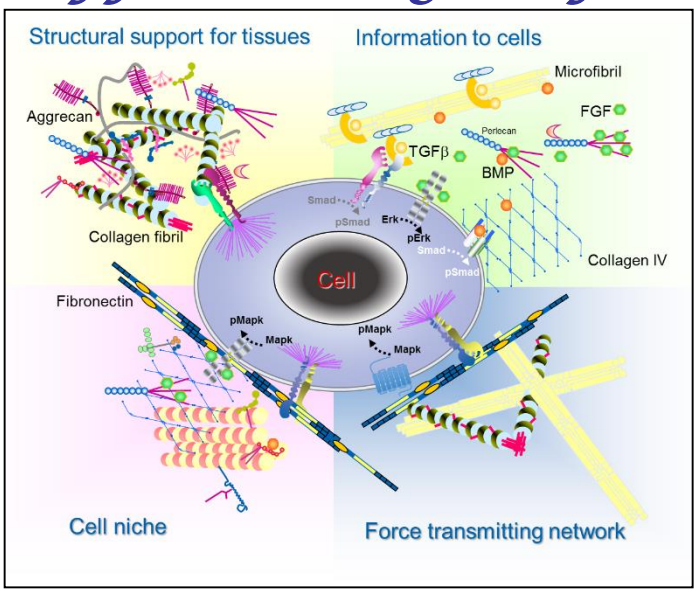
Department of Molecular Biology and Biochemistry

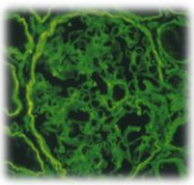
"Extracellular Matrix" supports living body

The extracellular matrix (ECM) plays a major role for supporting cells. ECM macromolecules are secreted locally by the cells to wear "tailor-made" ECMs for their suitable conditions in a tissue-dependent or a time-dependent manner. It became well known that ECM is important not only for intercellular space-filling substances but also for regulating cell behavior (survival, proliferation and motility) through growth factor receptors, mechanoreceptors etc. The ECM is not a static structure, but is constantly remodeled by proteolytic enzymes including MMPs. We hope to develop our basic findings into clinical outcomes in future.



Basement membrane in barriology

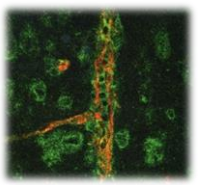
Basement membranes control cellular functions, which are assembled in tissue- or disease- specific manner. We focused on the barrier function in cancer and vascular system.



Basement membrane

Basement membrane in tissue repair

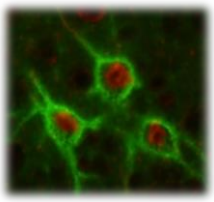
ECM are dynamically changed in spinal cord injury. The molecular mechanisms are important for the repair of blood-brain barrier, scar formation, and angiogenesis, etc.



Blood-brain barrier

Perineuronal matrix

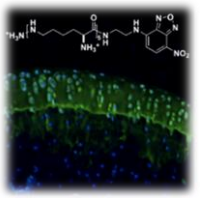
Perineuronal matrix consists of perineuronal net and perinodal net, which are important for the control of neural plasticity and saltatory conduction.



Perineuronal net

Bio-imaging and theragnosis

We aim to establish new technologies to visualize ECM macromolecules or to target them for theragnosis (therapy & diagnosis).



Articular cartilage bio-imaging

ADAMTS

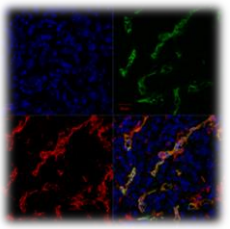
ADAMTS is a member of metalloproteinases.

We have found that ADAMTS1 is induced by hypoxia (***J Biol Chem***. 2009; 284(24): 16325-). We are focusing on regulatory mechanism of ADAMTS. Several ADAMTS transgenic mice are also analyzing in the current project.

ADAMTS and diseases

The role of ADAMTS in the diseases is our major topic.

The photo (right) showed the ADAMTS distribution (red) and angiogenesis (green) in the tumor tissues.



ADAMTS and angiogenesis

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