

Division of Natural System	Research field	Functional Biochemistry	Lab. ID NS05
Laboratory web site	<a href="http://www.se.kanazawa-u.ac.jp/bioafm_center/index.htm">http://www.se.kanazawa-u.ac.jp/bioafm_center/index.htm</a> <a href="http://pronet.s.kanazawa-u.ac.jp">http://pronet.s.kanazawa-u.ac.jp</a>		
Research subjects			
<p>Current research focuses on the following targets:</p> <ol style="list-style-type: none"> <li>1. Numerous biological phenomena are driven by protein enzymes whose primary structure is encoded in genetic information. Recently, the ability to direct observation of protein structures and dynamics have become a focal point in biology/biochemistry/medicine (seeing is believing!), and high-speed atomic force microscopy is a powerful tool that can accomplish this challenging task. Our lab aspires to simultaneously observe the structure and dynamics of biologically significant proteins using high-speed atomic force microscopy.</li> <li>2. Newly synthesized polypeptides become mature proteins through folding. We analyze reaction mechanisms of molecular chaperones that help polypeptides mature.</li> <li>3. Although bacterial cells were historically considered to be simple with a low degree of subcellular compartmentalization, decades of studies have shown that a number of unique organelles can be found in bacterial cells. These bacterial organelles support diverse survival strategies for the bacteria, which allow them to thrive in various environments. Our goal is to elucidate the molecular mechanisms that are responsible for the synthesis and function of bacterial organelles. We study an organelle from magnetotactic bacteria called the 'magnetosome', which is one of the most studied bacterial organelles in the world.</li> </ol>			
Master/Doctor course: Education policy, curriculum, typical activity in the laboratory			
<p>Students will determine their research plan at the start of their graduate studies. They will have access to a wide range of state of the art equipment as well as expert guidance during the course of their research. It is hoped that students fervently work on their research and present their results at scientific conferences. Preparation for presenting at meetings will take place at our weekly Journal Club and Progress Reports, which provide the students with a nurturing scientific environment to discuss recent activity in their field as well as a chance to present the progress of their own research to their peers.</p>			
Daily life in the laboratory, etc.			
<p>Our lab has enthusiastic students who do research in the areas of molecular biology, biochemistry, and microbiology, therefore new students will have the ability to learn various techniques across these disciplines. Additionally, our lab has a diverse community of international people, which allow the students the opportunity to have English conversations with their peers. This is especially advantageous to PhD students wishing to pursue an academic career or students whose job will involve international communication. (PhD course student's comment 1)</p> <p>We have a friendly and open lab environment in which students are free (and encouraged) to discuss their research results with other lab members in order to facilitate their endeavors. (PhD course student's comment 2)</p>			
Message or comments by the laboratory faculty staffs			
<p>Nature is a fascinating topic and boundless with many unanswered questions. Scientific research is about forming hypotheses about these intriguing natural phenomena, then planning experiments to test the hypotheses, followed by performing experiments to answer these questions, and finally discussing your results. To be successful in science, students need to become knowledgeable in various fields as well as in their specific field. They can accomplish this by attending classes that give them the opportunity to learn about the newest information in various scientific fields, as well as reading generic text books in addition to many scientific journals. Science is a fascinating and thrilling subject and we hope that students foster their own enthusiasm throughout the course of their research. Additionally, our lab has the advantage of collaborating with students from other universities, not just in Japan, but globally. We regularly have students from other universities visiting our lab to perform short-term research collaborations. This gives our students a chance to network with students and researchers from other universities and broaden their scientific experience.</p>			
Recent Master theses in these 3 years (+ more if appropriate)			
year.month	Thesis title (including English translation of Japanese thesis title)		
2017.3	Identification of Hsp70-binding sites on a substrate protein		
2017.3	Visualization and analysis of polar flagellar rotation in <i>Magnetospirillum magneticum</i> AMB-1		
2017.3	Functional analysis of MamK cytoskeleton using live-cell fluorescence imaging of magnetosomes		
2016.3	High-speed atomic force microscopy imaging of structural dynamics of amyloid $\beta$ 1-42 aggregates		
2016.3	Analyses of binding mechanisms of a Hsp70 chaperone system with Pyruvate Kinase (PKM2)		
2016.3	Purification and analyses of human Hsp70 (HSPA1) and Hsp40 (DNAJB1)		
2015.9	Cultivation and characterization of novel magnetotactic vibrio from freshwater pond in Kanazawa, Japan		

2015.3	Purification and characterization of human Hsp70 system (HSPA8, DNAJA1, BAG1)
2015.3	In vitro screening of DnaK-binding sites on $\sigma^{32}$
2015.3	High-speed atomic force microscopy observation of the dynamics of ubiquitylation by HECT type E3 ubiquitin ligase
2014.3	Relationship between a dimer structure and a cochaperone activity of Hsp40
2014.3	Refolding mechanisms of an unfolded protein in an Hsp70 chaperone system
2014.3	Visualization of subcellular dynamics of bacterial organelle magnetosomes by live-cell fluorescence imaging
2014.3	Electron microscopic observation and molecular phylogenetic analysis of novel giant magnetotactic bacteria
2014.3	Screening of inhibitors for nitric oxide reductase from denitrifying bacteria
2014.3	Identification of interacting partners with FtsZ-like cytoskeletal protein from magnetotactic bacteria
2013.9	Functional analyses of novel hemoprotein MamP associated with biomineralization of magnetite crystal
2013.3	DnaK binds multiple sites on $\sigma^{32}$
2013.3	DnaJ promotes formation of DnaK- $\sigma^{32}$ complexes
2013.3	Biochemical studies on proteases from <i>Bacillus</i> species
2013.3	Isolation and cultivation of endosymbiont bacteria harbored in <i>Oligobrachia mashikoi</i> (a Siboglinid Polychaete)
2013.3	In vitro polymerization and characterization of actin-like cytoskeletal protein MamK
2013.3	Diversity of bacterial population in the fermented food
2013.3	Purification and characterization of FtsZ-like protein encoded in the magnetosome island
Recent Doctoral theses in these 3 years (+ more if appropriate)	
year.month	Thesis title (including English translation of Japanese thesis title)
2013.3	Studies on Magnetotaxis of Magnetotactic Bacteria Using Swimming Assay
2013.3	Studies on coacervate-forming proteins from <i>Papilio xuthus</i> pupae
Laboratory mail address	Hiroki Konno <hkonno*at*se.kanazawa-u.ac.jp> Masaaki Kanemori <mkanemo*at*staff.kanazawa-u.ac.jp> Azuma Taoka <aztaoka*at*staff.kanazawa-u.ac.jp> Takahiro Nakayama <tnakawata*at*se.kanazawa-u.ac.jp>