Division of Electrical Engineering and Computer Science	Research field	Biofunctional engineering	Lab. ID EC18

Laboratory web site

Research subjects

There are unclear points about effect of physical stimuli, including magnetic fields, on living organisms. In basic research, we observed that enhancement in the drug potency on exposure to 60 Hz magnetic fields depended on the magnetic flux density. If magnetic fields enable us to enhance the potency of anticancer drug on target region only, the dosage can be reduced and thus side effects can be suppressed in clinical cancer chemotherapy. Our laboratory investigates the effective condition (magnetic flux density, frequency and exposure time etc.) and the action mechanism of magnetic fields, on the potency of chemical agents.

Master/Doctor course: Education policy, curriculum, typical activity in the laboratory

Graduate students take lab seminars besides regular classes. In the seminar, students introduce other research paper or an international journal related with each theme, and we discuss its approach, results and considerations. At a weekly meeting, students report on progress and their plans for the future research, then they are given advice and conduct. Graduate students are supposed to present their research at academic conferences or workshop several times a year.

Daily life in the laboratory, etc.

We usually spend our free time friendly and cheerfully at the laboratory, but it comes to studies, we work steadily. Our teacher is gentle to us and we have established good relations, so we students can give our opinions freely. If we're responsible for what we should do, our teacher lets us go ahead with our work independently. In the laboratory, we're well provided with instruments we need. We can also have many opportunities to participate in conferences and have valuable experience.(M2)

Message or comments by the laboratory faculty staffs

I hope students and graduate students in my laboratory are willing to work on their researches. Unlike experiments in class, results of researches are unknown, so I'd like you to experience difficulties and pleasure in advancing research by trial-and-error. Particularly in research themes, students treat biological materials which are not always under the same condition, the result of experiment should be reproducible; thus repeated experiments and statistical analysis of the data are needed.
Although you'll have to prepare for job hunting, spend your time effectively and enjoy researches together.

Recent Master theses in these 3 years (+ more if appropriate)

year.month	Thesis title (including English translation of Japanese thesis title)
2021.3	Effects of 60 Hz magnetic field on membrane potential of human cancer cells
2020.3	Diversity of rDNA sequences in marine bacteria cultured by novel method.
2020.3	Effects of magnetic fields and anticancer drugs on membrane potential of human cancer cells
2019.3	Evaluation of combined effect of anticancer drug and magnetic field on two kinds of human cancer cell lines
2018.3	Effect of magnetic fields on anticancer drugs potency in multidrug-resistant cancer cells
2018.3	Effect of magnetic fields on the activity of cell division inhibitor in bacteria
2017.3	Effect of magnetic fields on anticancer drugs potency and uptake in human cancer cells
2016.3	Effect of ELF magnetic fields on anticancer drug potency and membrane permeability of human lung cancer cells
2014.3	Eddy-Current testing in narrow space by using needle type probe
2013.3	60 Hz magnetic fields effect of the anticancer drug potency on human cell
2013.3	Magnetic measurement for liquid phase magnetic nano particles with needle type magnetic probe

Recent Doctoral theses in these 3 years (+ more if appropriate)

year.month	Thesis title (including English translation of Japanese thesis title)

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