

バイオサイエンス学科 論文発表

【発表者について】 アンダーラインは本学教員および研究員、※は大学院生、卒研究生または卒業生

題名	Nonlinear electrical impedance spectroscopy of viruses using very high electric fields created by nanogap electrodes
掲載雑誌	Frontier in Microbiology
著者	Hatsuki R, Honda A, Kajitani M, Yamamoto T.
概要	<p>Our living sphere is constantly exposed to a wide range of pathogenic viruses, which can be either known, or of novel origin. Currently, there is no methodology for continuously monitoring the environment for viruses in general, much less a methodology that allows the rapid and sensitive identification of a wide variety of viruses responsible for communicable diseases. Traditional approaches, based on PCR and immunodetection systems, only detect known or specifically targeted viruses. We here describe a simple device that can potentially detect any virus between nanogap electrodes using nonlinear impedance spectroscopy. Three test viruses, differing in shape and size, were used to demonstrate the general applicability of this approach: baculovirus, tobacco mosaic virus (TMV), and influenza virus. We show that each of the virus types responded differently in the nanogap to changes in the electric field strength, and the impedance of the virus solutions differed depending both on virus type and virus concentration. These preliminary results show that the three virus types can be distinguished and their approximate concentrations determined. Although further studies are required, the proposed nonlinear impedance spectroscopy method may achieve a sensitivity comparable to that of more traditional, but less versatile, virus detection systems.</p>