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[\[Image PDF \(1659K\)\]](#) [\[References\]](#)**Cholesterol Removal Using a MIR Free Electron Laser in an Atherosclerotic Region**[Yuko FUKAMI](#)¹⁾, [Sachiko YOSHIHASHI-SUZUKI](#)²⁾ and [Kunio AWAZU](#)²⁾

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Abstract: In order to estimate the optimum laser conditions for efficient dissociation of cholesterol ester in an arterio-sclerotic region of blood vessels, we have investigated the relationship between the laser parameters and cholesterol ester dissociation using a MIR free electron laser (FEL). In this study, cholesteryl oleate, a typical cholesterol ester found in arteriosclerotic regions, was irradiated with 5.75- μm -FELs, which is known to cause vibration of ester bonds. The following results were obtained. (1) Ester dissociation depended upon the absorption coefficient. The macropulse duration was shorter than the thermal relaxation time, showing that the ester bonds dissociated into carboxylic acid and cholesterol by macropulse-induced thermal effects without accompanying thermal diffusion. (2) Using a wavelength of 5.75 μm , the maximum ester dissociation ratio was achieved under the optimum laser conditions of a macropulse energy density greater than 0.4 J/cm². (3) 5.75- μm -FEL was estimated to dissociate cholesterol ester under endothelial cells without thermal damage.

Key Words: [MIR](#), [Free electron laser \(FEL\)](#), [5.75 \$\mu\text{m}\$](#) , [Cholesterol ester](#), [Arteriosclerotic region](#)

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