

**ACOUSTICS2008/2334**  
**Anisotropy of ultrasonic longitudinal wave in the cortical bone of bovine femur**

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Quantitative ultrasound (QUS) is a good method to measure elastic properties of bone. It is known that the mammalian cortical bone shows strong anisotropy and inhomogeneity. We have investigated the distribution of ultrasonic longitudinal wave properties in bovine femur, considering the structure in the nanoscopic level [Yamato et al. *Calcified Tissue International*, Accepted]. In this study, the anisotropy in the axial-tangential plane of bovine cortical bone is experimentally investigated using an ultrasonic pulse technique. The ultrasonic pulse measurement was performed using a PVDF focus transmitter (Custom made, Toray) and a self-made flat PVDF receiver. Three ring-shaped cortical bone samples were made from a 32-month-old bovine femur. Four cylindrical specimens were taken from one ring-shaped cortical bone sample along the radial direction. The anisotropy of speed was investigated by rotating the specimens. We found that directivities of ultrasonic longitudinal wave in these specimens were similar. In addition, the direction of the fastest wave speed was a little different from the bone axis. The results indicate the complicated anisotropy of the cortical bone.