

論文内容の要旨

Comparative anatomy of hind-limb morphology associated with
aquatic adaptation among Mustelidae

(イタチ科における水棲適応に関連する
後肢形態の比較解剖学的研究)

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This study investigated the morphological trends associated with the aquatic tendency in closely related species of Mustelidae: sea otter *Enhydra lutris*, Eurasian river otter *Lutra lutra*, American mink *Neovison vison*, Japanese weasel *Mustela itatsi*, and Siberian weasel *M. sibirica*. Mustelidae exhibit high diversity in their ecology and their locomotor types are categorized into three groups: terrestrial, semi-aquatic, and aquatic. The aquatic tendency was

determined in these five species based on ecological data. The order of the aquatic tendency from high to low was as follows: *E. lutris*, *L. lutra*, *N. vison*, *M. itatsi*, and *M. sibirica*. The myologies of these species were determined and compared qualitatively. Three muscles in *E. lutris*, i.e., gluteus superficialis, caudofemoralis, and tensor fasciae latae, were fused and they may act as a femur abductor. A comparison of the masses of the hind-limb muscles showed that the gluteus superficialis group, fibularis group, and popliteus of *E. lutris* were remarkably larger than those of the other species. The increased mass of the muscles in the distal part of the hind-limb was confirmed in terrestrial and semi-aquatic Mustelidae in the order of their aquatic tendency. I compared the lengths of the bones related to the hind-limb, i.e., the pelvis, femur, and tibia, among the five species. The relative length of the femur was lower in the species with higher aquatic tendencies. The relative length of the ilium was highest in *E. lutris*. A carcass of *E. lutris* was scanned using a medical diagnostic CT scanner, and the maximum abduction angle of the femur was measured. The results showed that *E. lutris* possessed the highest degree of femur abduction. Thus, I determined the specific functional morphological characteristics of *E. lutris* as a fully aquatic species based on the muscle descriptions, muscle masses, bone measurements, and the maximum degree of femur abduction. I suggest that *E. lutris* has an adaptive status that is separated discontinuously from the other Mustelidae species. The results indicate that there were obvious differences in the hind-limb morphology of *E. lutris* and other semi-aquatic Mustelidae. This

suggests that *E. lutris* may be situated in an adaptational status that is discontinuously separated from the other Mustelidae species. The morphological characters of *E. lutris* observed in this study demonstrates its discontinuous adaptation, which suggests that its unique method of swimming includes the abduction of femur.