Gastrointestinal Length and Cecum of Slow Loris(*Nycticebus coucang*)

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スローロリスの腸管長と盲腸について

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ABSTRACT. The gastrointestinal length and morphology of the cecum and vermiform appendix were recorded in one male and two female slow lorises maintained at Yogyakarta, Indonesia. Although the slow loris was a prosimian, its cecum and vermiform appendix were well developed compared to those in the Japanese monkey, rhesus, baboon, tamalin, galago and tupai. The slow loris cecum was distinctly different from the short tubular diverticulum found in tupai. The small intestine length was 30-50 cm, the large intestine length was 18-33 cm, and the lengths of the cecum and vermiform appendix were 5 cm and 2-4 cm, respectively.

Key Words : Slow loris, gastrointestinal length, cecum, vermiform appendix

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In the last twenty years, there have been several reports regarding the anatomy of the slow loris (*Nycticebus coucang*), one of the prosimians [1-12].

However, the structure of the alimentary canal, including the cecum and vermiform appendix, did not appear to attract the attention of the authors of those reports. In this laboratory, the length of the intestine of the Japanese monkey [13], baboon [14], galago [15], tamalin, and tupai [16] have been recorded. Since the morphology of the cecum with or without vermiform appendix is one of the key indices of the function and evolution of the

digestive system of different species [17-22], this short report describes the feature of the well developed cecum and vermiform appendix of the slow loris.

Three slow loris (two females and one male) maintained at the Department of Anatomy, Faculty of Veterinary Medicine, Gadjamada University, Yogyakarta, Indonesia, were sacrificed with an overdose of ketamine hydrochloride injection. Their abdominal organs were dissected out, measured, photographed, and preserved in buffered formalin as described in our previous report [12].

Table 1. Length and diameter of the slow loris's intestine. (cm)

	B.W.	Stomach	Small intestine	Cecum	Appendix	Large intestine
♂	381.0 g	4	30(0.8-1.1)	5(1.5-1.8)	2(0.4-0.6)	18(0.9-1.4)
♀	430.6 g	4	37(1.0-1.5)	5(1.5-2.0)	2.5(0.5-0.9)	33(1.2-1.8)
♀	458.7 g	5	50(1.2-2.0)	5(2.0-2.5)	4(0.5-0.7)	23(1.0-2.0)

Table 1 gives the measurements for the length of the intestine.

The general view of the stomach and intestine shows the well developed cecum and vermiform appendix (Fig. 1).

The length of the small intestine and that of the large intestine, except for the cecum, were 30-50 cm and 18-33 cm, respectively. The diameter of the small intestine (0.8-2.0 cm) was smaller than that of the large intestine (0.9-2.0 cm) on closer observation (Fig. 2). The cecum and vermiform appendix joined each other at an obtuse angle. The junctional portion of the vermiform appendix was conical in shape, but its tip was tubular.

Lorisidae, one of the prosimians, has five genus

and ten species, including *galaginae* (bush baby), *Perodicticus potto* (potto), and *Nycticebus coucang* (slow loris) [23-33].

The slow loris has at least nine subspecies; *bancanus*, *bengalensis*, *borneaus*, *coucang*, *hilleri*, *insularis*, *natunae*, *javanicus*, and *tenasserimesis*. The present report is on *javanicus*.

Lorisines, a nocturnal primate, moves quite slowly, and this function is reflected in their muscle structures [4, 5]. Different from similarly sized galagines, lorisines have a lower basal metabolism, slower growth rate, slower development, smaller litter size, and consequently, a reduced reproductivity.

In tupai, the cecum was a short simple tubular

Fig. 1 A general view of the gastrointestinal canal of esophagus (E), stomach (S), cecum (C), vermiform appendix (A), and rectum (R).

Gastrointestinal Length of Slow Loris

Fig. 2 Junctions between the cecum (C) and vermiform appendix (A) and the jejunum and cecum. Slight constriction at the base of the vermiform appendix (arrow) is noticeable.

diverticulum without vermiform appendix [16].

Of the primates, the bush baby, velvet monkey, macaque including rhesus, pig tailed and Japanese monkeys, baboon, colubus monkey, squirrel monkey, night monkey, wooly monkey, chimpanzee, orangutan, and human have a distinct cecum.

The vermiform appendix, which exists both in adults and in the fetuses of humans as well as in chimpanzees and orangutans is not always evident in primates. The existence of a vermiform appendix in the slow loris, therefore, is an index of the evolution of the intestinal tract.

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要 約

ジャワ島ジョクジャカルタで飼育されていた雄1頭と雌2頭のスローロリスの腸管の長さ、盲腸および虫垂の形態を記録した。これまでに、日本猿、台湾猿、アカゲザル、ヒヒ、タマリン、ガラゴ、およびツパイで見たものに比較して、スローロリスは原猿でありながら明らかに盲腸と虫垂が良く発達していた。短管状の憩室に過ぎないツパイの盲腸と比較すると対照的であった。小腸の長さは約30~50 cm、盲腸以外の大腸の長さは約18~33 cmで、盲腸と虫垂の長さはそれぞれ約5 cmと2~4 cmであった。

キーワード：スローロリス、腸管長、盲腸、虫垂

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