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Histological Observation on the Female Prostate in Mongolian Gerbils (*Meriones unguiculatus*)

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In Mongolian gerbils, prostatic buds were found in female fetuses at the 23th day of gestation. In the mothers the well-developed prostate gland consisting of a paired lobes was situated on either side of the neck of the bladder. — KEY WORDS : female prostate, Mongolian gerbil

Although the prostate gland is one of the accessory genital glands of the male, it has been reported that a rudimentary prostate gland is occasionally seen in female rats [5, 7, 11]. Furthermore, it has been demonstrated that a well-developed prostate is present in female *Mastomys* [1, 8, 9]. In the course of studies on the development of Mongolian gerbils, we have found the female prostate. It is the object of this paper to describe the prostate in both the fetal and adult female Mongolian gerbils.

Mongolian gerbils were used in this study. They were maintained in our laboratory as a closed colony for over 10 years. The original stock of animals was derived from the Central Institute for Experimental Animals (Nogawa, Kawasaki, Japan). All the animals were kept in a room under controlled conditions of the temperature ($22 \pm 1^\circ\text{C}$), humidity ($55 \pm 5\%$) and light (14 h light : 10 h dark). The animals were allowed to take standard laboratory rations (Rat chow ; MM-1, Funabashi Farm Co. Ltd., Chiba, Japan) and clean fresh water, both *ad libitum*.

Four pairs of males and females aged 4 months were caged together, and a vaginal

smear was taken every morning. The day when the sperm was first observed in the vaginal smear was defined as the 0-day of gestation. The mothers were sacrificed at the 23th day of gestation under sodium pentobarbital anesthesia. A total of 9 female and 11 male fetuses was obtained. The fetuses were fixed *in toto* in Bouin's fluid. At the same time, the parts of the urogenital tracts near the neck of the bladder were removed from the mothers and also fixed in Bouin's fluid. Fixed materials were dehydrated in a graded series of ethanol, embedded in paraffin, sectioned at $6\ \mu\text{m}$, and stained with hematoxylin-eosin.

The anlage of the prostate was already visible in female fetuses at the 23th day of gestation. A few prostatic buds were situated on the part ventral to the urogenital sinus (Fig. 1). In male fetuses at the same stage, many prostatic buds were clearly observable around the urogenital sinus. In the urogenital tract of the mother, the well-developed prostate consisting of a paired lobes was observed to be closely located on both sides of the neck of the bladder (Fig. 2). The prostatic acini were lined with simple squamocolumnar or columnar epithelial cells having round nuclei in

their basal parts. The secretory products of the acini were slightly stained with eosin (Fig. 3). The stroma between the acini was made of the connective tissue containing smooth muscle fibres.

It is well known that masculinization of the external genitalia and the development of the accessory genital glands such as the prostate, seminal vesicle and bulbourethral gland are attributable to the effects of androgen secreted from the fetal testicular Leydig cells [3, 6]. The ovaries have no androgenic action on the urogenital tract [3, 6]. In Mastomys, the well-developed and functional prostate is seen in the female [1, 8, 9]. It is well established that the female prostate develops and differentiates naturally in a low androgen environment [2, 4]. Ovariectomy in Mastomys induced the regression of the prostate by 30% [10]. Adrenalectomy in the gonadectomized female induced significant (65%) involution of the prostate [10]. These findings suggest that the well-developed female

prostate found in Mongolian gerbils may be attributable to the effects of androgen related to adrenal gland.

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雌スナネズミ 前立腺の組織学的観察

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妊娠23日目の母体スナネズミから胎仔を取り出し尿生殖道を組織学的に観察したところ、雌胎仔の尿生殖洞の腹側に前立腺の原基が認められた。同時に母体について

も調べたところ膀胱頸部の両側に一對の良く発達した前立腺が観察された。

Explanation of Figures

1. Bladder	2. Mesonephric duct	3. Mesonephric duct (regressed)
4. Prostate	5. Prostatic bud	6. Rectum
7. Urethra	8. Urogenital sinus	9. Vagina

Fig. 1. On day 23 of gestation, the prostatic buds are observable in female fetus in the part ventral to the urogenital sinus $\times 110$

Fig. 2. In the mother aged 4 months, the prostate (right lobe) is closely situated on either side of the neck of the bladder $\times 35$

Fig. 3. High power view of the prostate in Fig. 2 shows that the prostatic acini of the mother are lined with simple squamocolumnar or columnar epithelial cells having round basal nuclei in their basal parts. The secretory products of the acine are slightly stained with eosin. $\times 140$

Fig. 1

Fig. 2

Fig. 3