DEVELOPMENT OF THE ADENBHYPOPHYSIS ADRENOCORTICOTROPHIC HORMONE (ACTH) CELLS OF LONG-TAILED MONKEY (*Macaca fascicularis*) DURING PRE- AND POSTNATAL PERIOD

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Introduction

Long-tailed monkey is one of the primate species which is frequently used in biomedical research animal. This animal has closed relationship with human in anatomy, physiology and their body metabolism. The basic data of their anatomy and physiology are important for long-tailed monkey to be ideal research animal, however only a few of the basic data of this animal have been explored. Development of the adenohypophysis included their endocrine cells is not reported yet. The endocrine cells of adenohypophysis are synthesis and secrete some important hormone that regulates growth and homeostasis of the body One of adenohypophysis endocrine cells is adrenocorticotrophic hormone (ACTH) cells that synthesis and secretes ACTH. In adult, this hormone is important to influences the activity of adrenal cortical while in fetal life this hormone is to induce the growth and development of fetal adrenal cortical cells and blood vessel of adrenal gland. The relationship between fetal adenohypophysis ACTH cells – adrenal gland axis in Beagle dog (Sasaki *et al.* 1998) and long-tailed monkey (Nurhidayat *et al.* 2008) have been studied: however distribution of the adenohypophysis ACTH cells in long-tailed monkey has not bean yet. This study is aimed to investigate the development of adenohypophysis ACTH cells during pre-postnatal period of long-tailed monkey.

Materials and Methods

Fetal hypophysis of long-tailed monkey aged 70 (F-70), 85 (F-85), 100 (F-100), 120 (F-120), 150 (F-150) days of gestation and postnatal aged 10 (P-10) and 105 (P-105) days old were used as material research. All of the samples were obtained from Primate Research Center, Bogor Agricultural University (PSSP-IPB). Pre-postnatal monkeys were sacrificed by perfusion method using 0.2% paraformaldehyde in 0.1M PBS under deep anesthetization with pentobarbital. The sampling processes under supervising of Animal Care and Use Committee/ACUC (PSSP LPPM IPB, 02-0030IR). The samples were fixed in 0.4% paraformaldehyde, and then processed to paraffin embedoing procedure. The tissue blocks were sectioned 10 µm serially at sagittal plane. The sections were stained imrnunohistochemically with avidin-biotin complex method using h-ACTH antiserum (Gift NIDDK USA). The distribution of the ACTH immunoreactive (ir) cells were described in adenohypophysis areas; pars ditalis included *caudal* anterior Rathke *pouch* area (Ca), *caudal distal* area (Cd), *middle zone* (M) and sex zone (S), also pars intermedia (I) and pars tuberalis (T). The density of ACTH-rr cells in each area of adenohypophysis using scoring method.

Results and Discussions

During prenatal period, adenohypophysis ACTH-ir cells of long-tailed monkey were increased in density and changed in their distribution (Table 1). while in porcine (Sasaki et al. 1992) and Beagle dog (Sasaki et *al.* 1998), density of ACTH cells during prenatal life increased but not in their distribution. In F-70, the ACTH-ir cells were observed in entire of the pars distalis areas and pars intermedia, but not in pars tuberalis. Density and intensity of ACTH-ir cells in pars intermedia higher than other areas in pars distalis as well as found in porcine (Sasaki *et al.* 1992) and Beagle dog (Sasaki *et al.* 1998), but existence of ACTH in this area as precursor of a-MSH and CLIP (Brown 1994). This distribution pattern of ACTH-ir were not changed in F-85, however their density are higher than F-70. Some areas of pars distalis, density of the ACTH-ir

cells were abundant especially in caudal areas, whereas in middle zone and sex zone the ACTH-ir cells were found in lower density. In F-100, the ACTH-ir cells of adenohypophysis started changing in their distribution pattern, the density of these were more abundant in the middle zone. Furthermore in F-120, the distribution pattern of ACTH-ir cells was changed in all of areas of adenohypophysis. Then, this distribution patterns were established and fixed in their definitive position as found in older of samples. Adenohypophysis ACTH established earlier that inferred to induce the development of cortical adrenal zones that established at 150 days old of fetus in long-tailed monkey (Nurhidayat *et al.* 2008). The density of adenohypophysis ACTH-ir cells were abundant found in caudal distal and middle whereas in *caudal anterior Rathke pouch* and *sex zone* appeared rare in their density.

Table 1 The distribution of the ACTH-ir cells in adenohypophysis of long-tailed monkey during pre-postnatal period.

Age	Adenohypophysis areas					
	Ca	Cd	M	S	I	T
F-70	+++	+++	+	+	++	-
F-85	+++	+++	+	+	+++	-
F-100	+++	+++	++	+	++++	-
F-120	+	+++	+++	+	++++	-
F-150	+	+++	+++	+	++++	-
P-10	+	+++	+++	+	++++	-
P-105	+	+++	+++	+	++++	-

T: pars tuberalis, S: sex zone, M: middle zone, Ca: *caudal anterior Rathke pouch*, Cd: *caudal distal* I: pars intermedia Not found= - , Rare= + , Moderate= ++ , Dense = +++ , Abundant= ++++

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