

A Survey of Spontaneous Cataract in Senior Cynomolgus Monkeys with or without Diabetes

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Introduction

In order to provide an animal model for testing novel therapies of cataract, an investigation of spontaneously developed cataract was conducted in a senior Cynomolgus monkey colony with or without diabetes.

Animals and Methods

The fasting serum glucose was tested around the time of ocular examination in 60 (56 male and 4 female) senior (age 11-27, 17.3±3.5 years, Mean±SD) Cynomolgus monkeys. Based on the serum glucose levels below or above 80 mg/dL, the subjects were divided into non-diabetic (69.6±7.6 mg/dL, n=31) and diabetic (200.4±85.9 mg/dL, n=29) groups. A thorough slit lamp microscopy was conducted bilaterally in sedated animal after pupil dilation. The incidence of spontaneous cataract was analyzed between the groups and among the age ranges. The relationship of diabetes and age was analyzed as well.

Results

Spontaneous cataract was found in 77 of 120 eyes (64.2%) including 67, 6 and 4 eyes in early cortex stage, mature cortex stage, and nuclear cataract, respectively. In addition, traumatic cataract was found in 3 eyes. Forty eyes appeared free of cataract (Figure 1, Table 1). The incidence of spontaneous cataract was 52.2% (33 of 62 eyes) in non-diabetic and 75.9% (44 of 58 eyes) in diabetic subjects (Figure 2). The incidence of the disease in different age ranges of 11-15, 16-20 and 21-27 years was 37.5% (15 of 40 eyes), 73.4% (47 of 64 eyes) and 93.8% (15 of 16 eyes), respectively (Figure 3). The average age was 16.7±3.1 (11-25) years for non-diabetic group and 17.9±3.7 (11-27) years for diabetic group without statistically significant difference (t=0.175)(Figure 4).

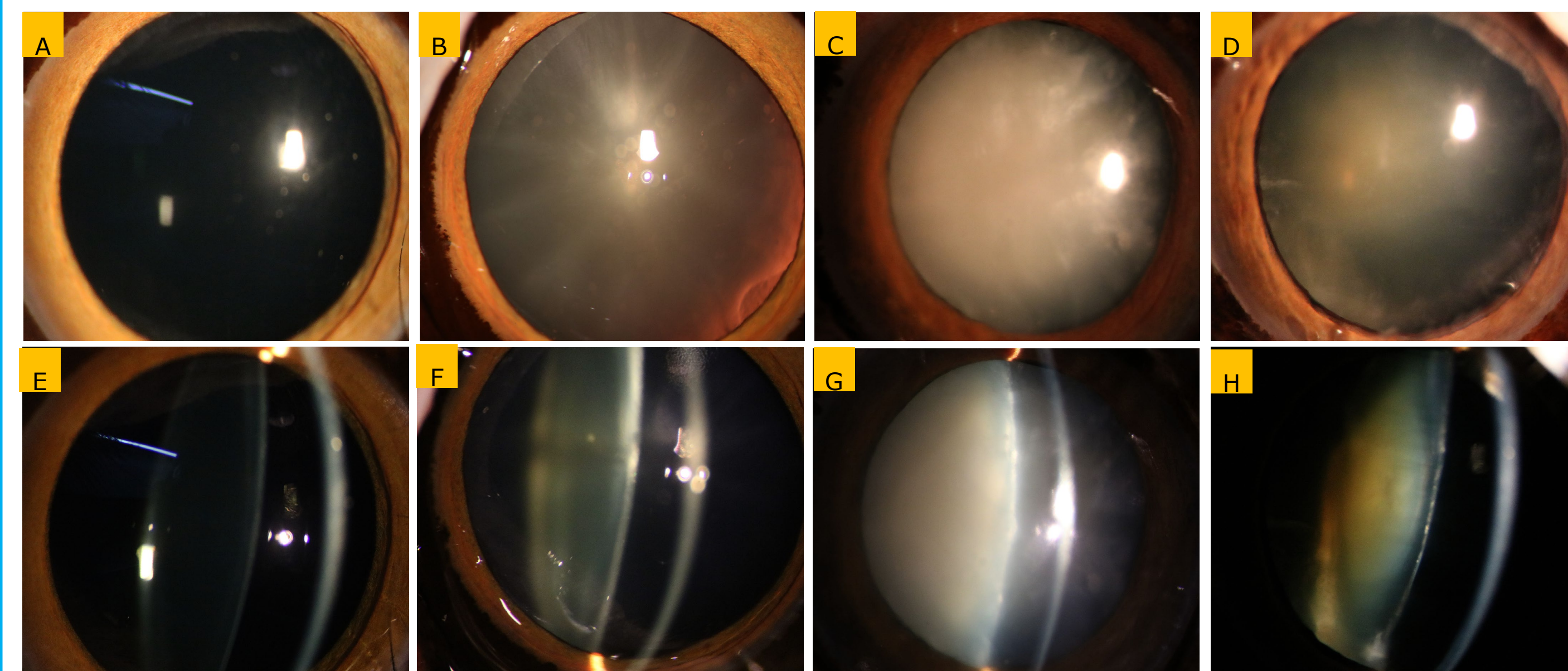


Figure 1. Slit lamp microscopy of Cynomolgus monkey eyes. The representative ocular images of non-cataract eye, early cortex cataract eye, mature cortex cataract eye and nuclear cataract eye were taken with diffused light in photo A, B, C, D and with slit light in photo E, F, G, and H, respectively.

Table 1. The case distribution of cataract found in a senior Cynomolgus monkey colony of 60 with or without diabetes,

Cataract Stages	Non Diabetic Subjects		Diabetic Subjects		All Subjects		All Eyes
	OD	OS	OD	OS	OD	OS	
Normal	14	12	8	6	22	18	40
Early Cortex	17	16	16	18	33	34	67
Mature Cortex	0	0	3	3	3	3	6
Nuclear	0	0	2	2	2	2	4
Traumatic	0	3	0	0	0	3	3
Total	31	31	29	29	60	60	120

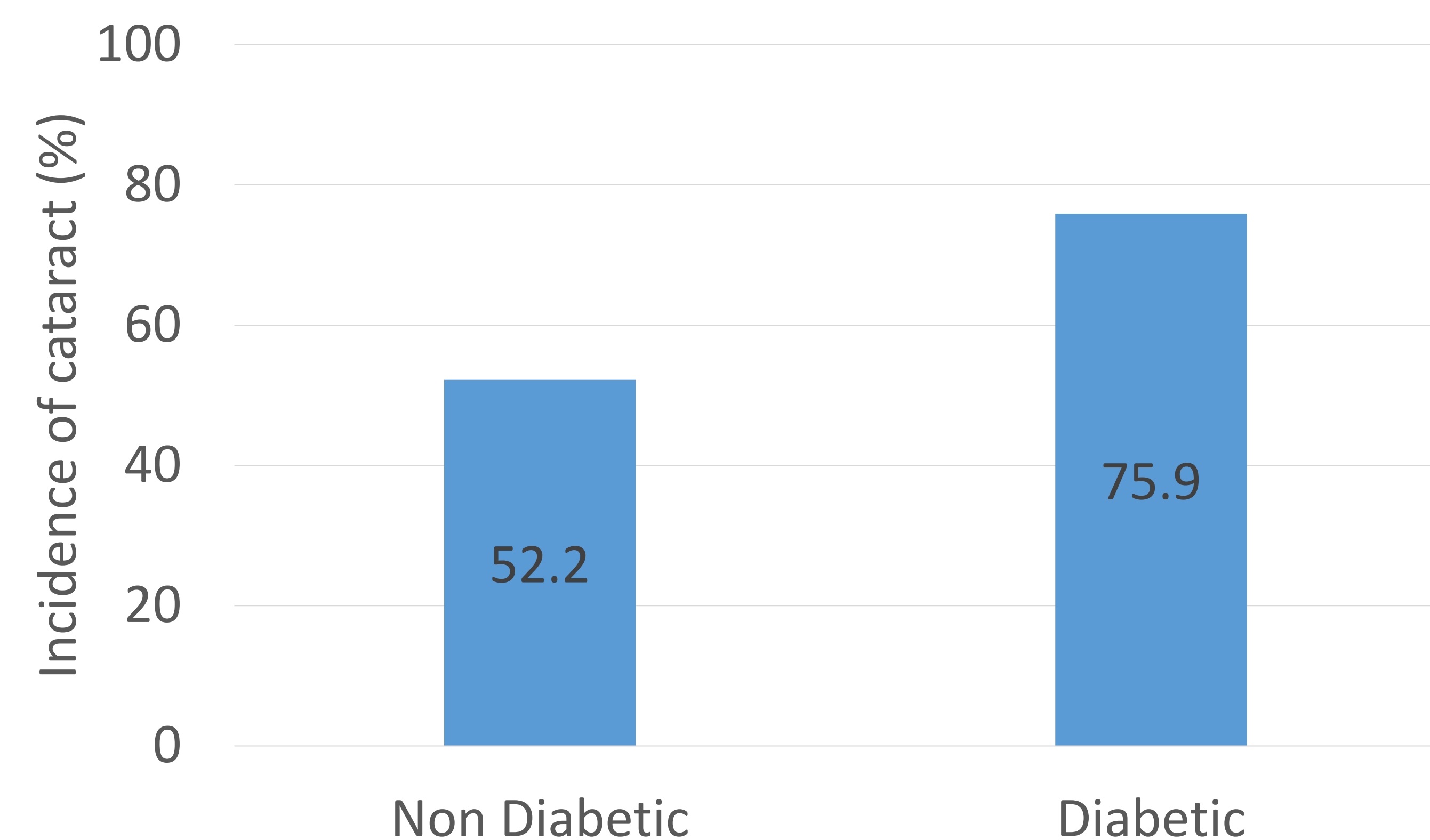


Figure 2. The incidence of spontaneous cataract was 52.2% (33 of 62 eyes) in non-diabetic and 75.9% (44 of 58 eyes) in diabetic subjects of this senior monkey colony.

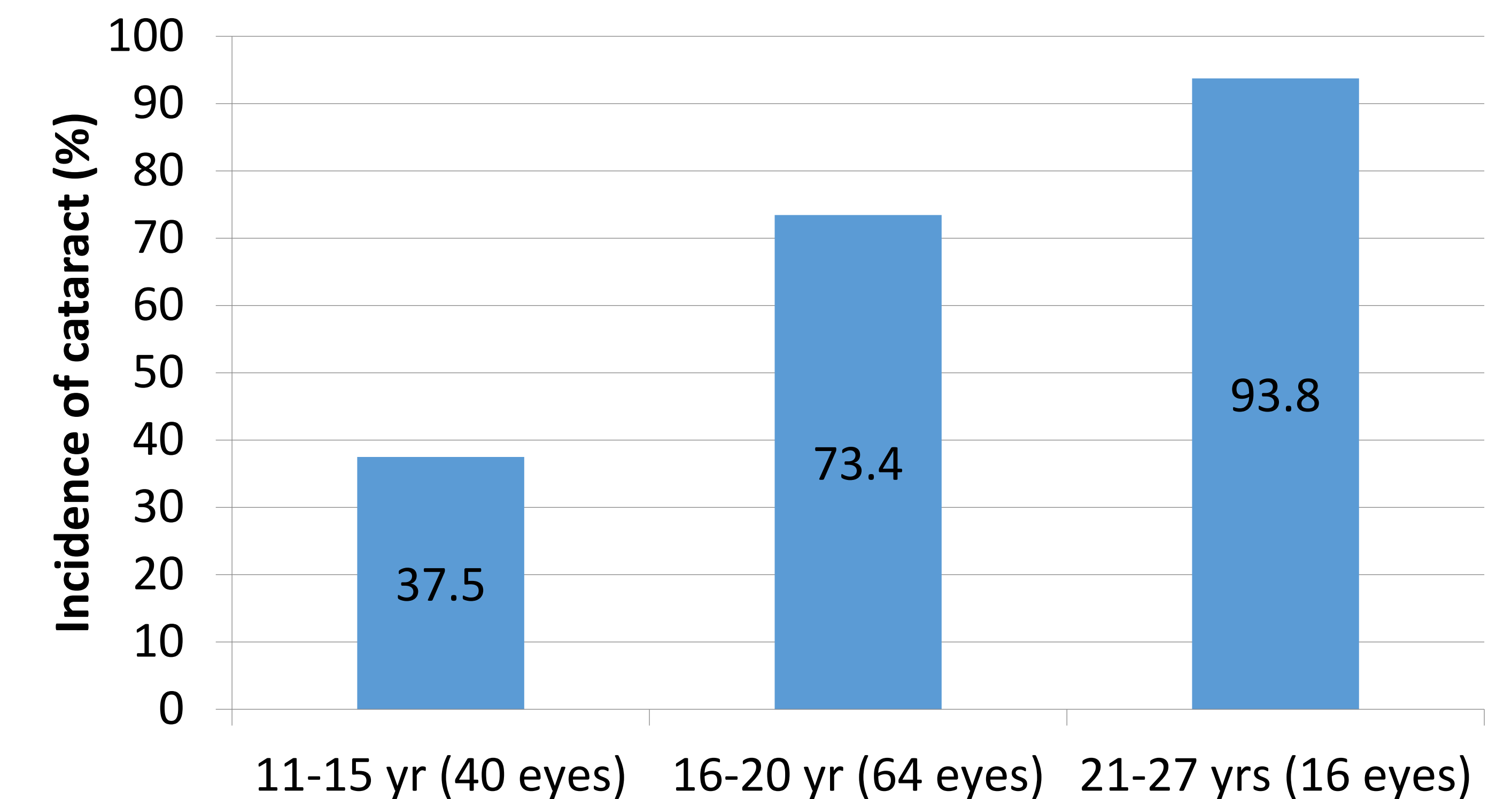


Figure 3. The incidence of the disease in different age ranges of 11-15, 16-20 and 21-27 years was 37.5% (15 of 40 eyes), 73.4% (47 of 64 eyes) and 93.8% (15 of 16 eyes), respectively.

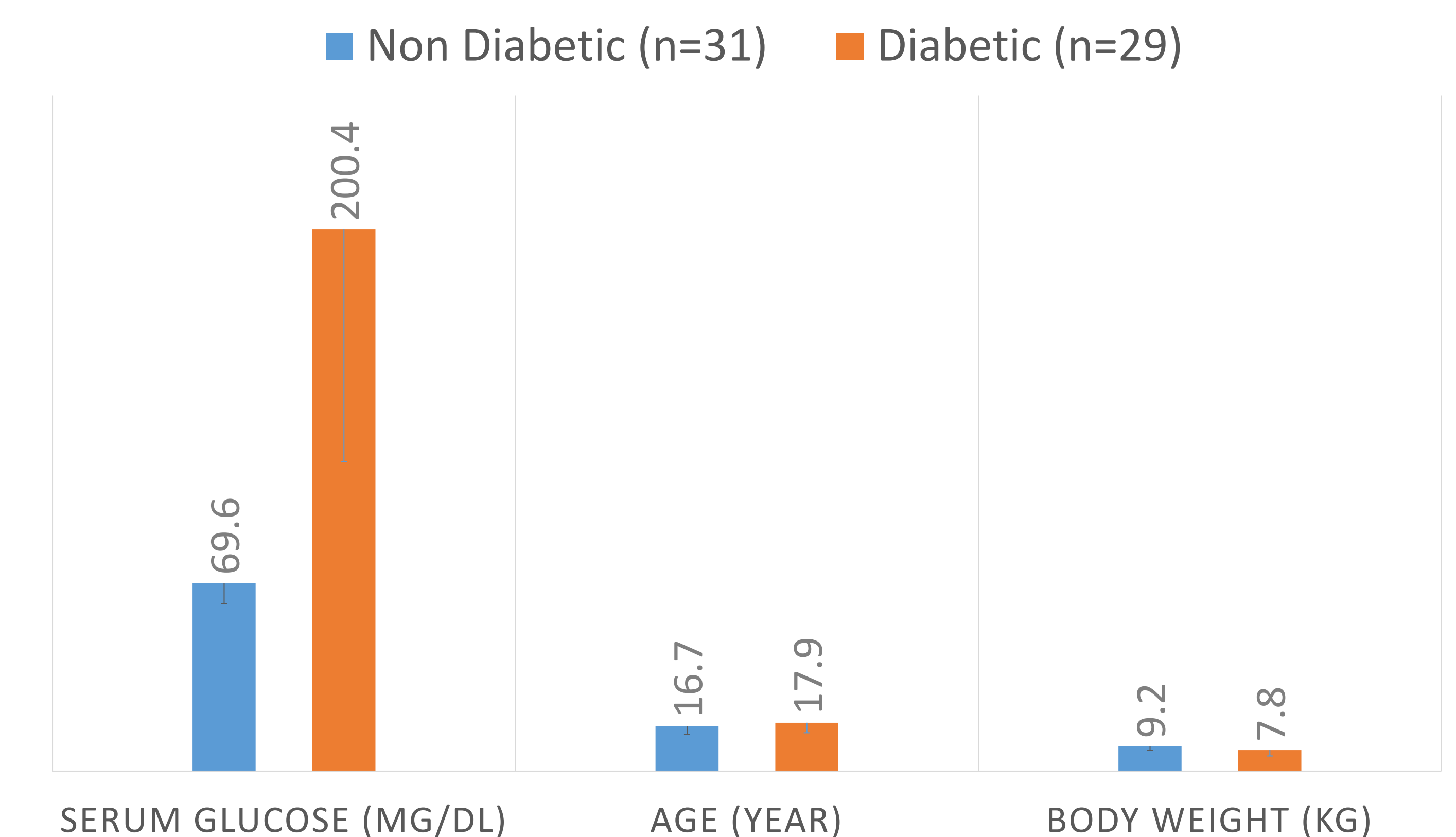


Figure 4. The average fasting serum glucose, age and body weight of non-diabetic and diabetic subjects (Mean ± SD).

Conclusions

The incidence of spontaneous cataract in senior Cynomolgus monkeys was positively associated with age and the level of serum glucose but not the body weight. The current study provided useful information of a spontaneous cataract monkey model and indicated the utility of this model in therapies of cataract.