

Lacrimal Gland Measurements in Most Common Preclinical Laboratory Animals

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INTRODUCTION

- The lacrimal gland (LG) is one of the primary glands responsible for tear production, and a potential route for new therapies targeting Dry Eye Disease (DED).
- The objective of this study was to describe the location and measure the size of the LG in rats, rabbits, dogs, swine, and nonhuman primates (NHP).

METHODS

- LGs were collected after the completion of general toxicology studies at Altasciences Preclinical Scranton.

Table 1: Animal Information

Species	Female (n)	Male (n)	Age
Rat, Sprague Dawley	1	11	4 months
Rabbit, New Zealand White	0	9	10 months
Dog, Beagle	6	3	3 years
Swine, Mini-Göttingen	2	10	6 months
NHP, Cynomolgus Monkeys	0	20	4-5 years

- Width was measured parallel to the limbus of the eye, length was measured to be perpendicular to the eye, and weight was measured using an analytical balance. Width and length were measured in mm, while weight was measured in mg.

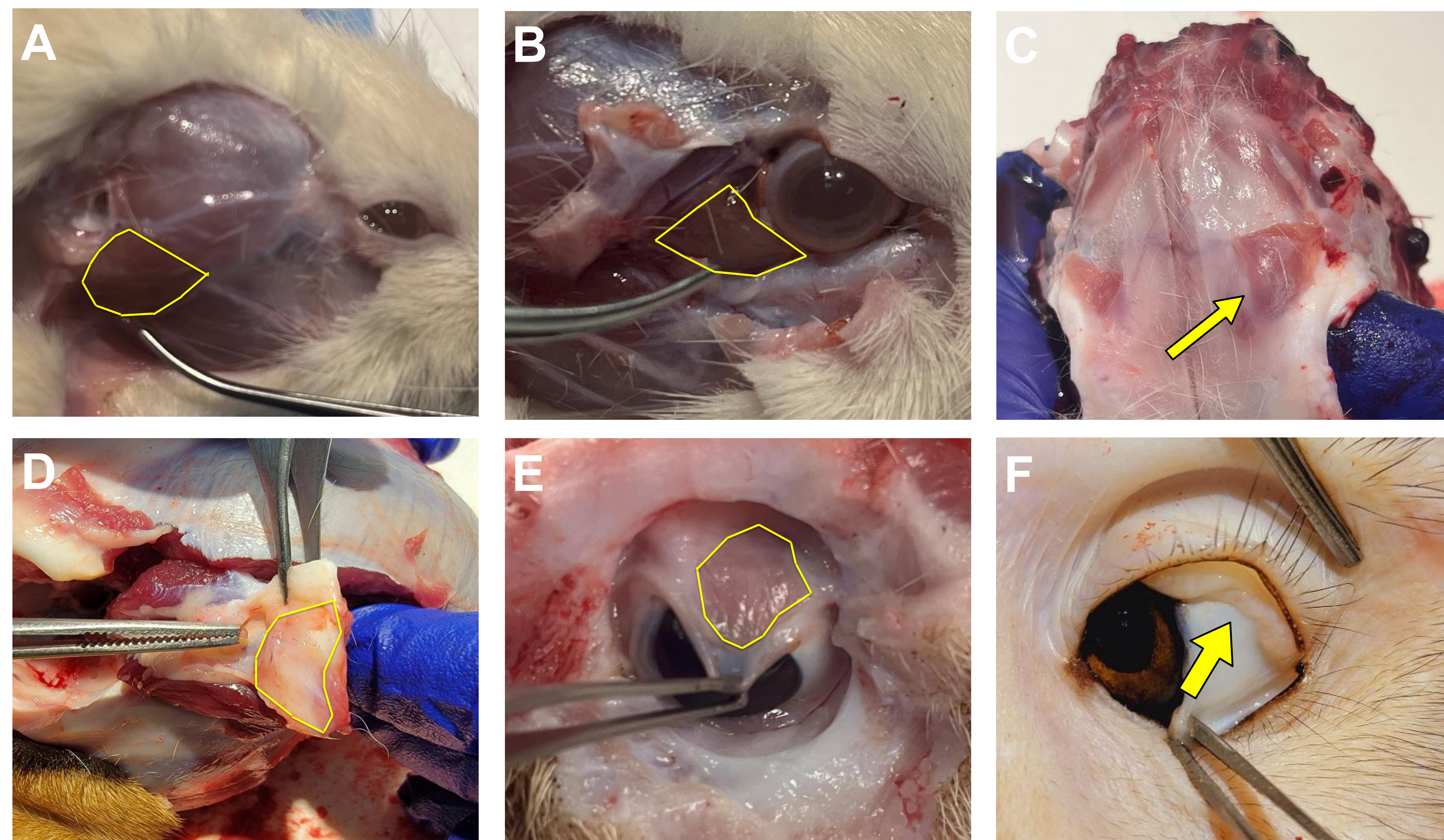


Figure 1. Representative images of Lacrimal Gland (LG) location in common laboratory animals: **A:** Exorbital LG in Sprague-Dawley rats, outlined in yellow. **B:** Intraorbital LG in Sprague-Dawley rats, highlighted in yellow. **C:** LG in NZW rabbit, visualized by pressing up on the superotemporal portion of the orbit. **D:** LG in beagle dog, visualized by removing the superotemporal portion of the orbit and outlined in yellow. **E:** LG in Mini-Göttingen swine, visualized by pulling the conjunctiva nasally and outlined in yellow. **F:** LG in cynomolgus monkeys, visualized by pulling the conjunctiva nasally.

RESULTS

- Exorbital LG in SD rats was located over the masseter muscle, mean weight of 117.4 ± 3.1 mg, and measured 7.9 ± 0.14 mm by 12 ± 0.31 mm. Intraorbital LG was located underneath the lower temporal part of the orbit, mean weight was 13.5 ± 1.9 mg, and measured 7.6 ± 0.27 mm by 3.3 ± 0.06 mm.
- LG in NZW rabbits were embedded posteriorly in the superotemporal part of the orbit, mean weight was 328.4 ± 23 mg, and measured 8.4 ± 0.17 mm by 20.2 ± 0.09 mm.
- LG in Beagle dogs were located in the superotemporal aspect of the globe and underneath the orbital ligament, mean weight was 337.9 ± 89.5 mg, and measured 11.1 ± 0.16 mm by 4.59 ± 0.23 mm.
- LG in Mini-Göttingen swine were located supratemporal of the globe. The mean weight was 60 ± 7 mg, and measured 9.9 ± 0.45 mm by 4.8 ± 0.24 mm.

Table 2: Lacrimal gland measurements in most common laboratory animal species. Results are reported as mean \pm standard error of the mean

	Rat, Intraorbital	Rat, Exorbital	Rabbit	Canine	Swine	NHP
No. of eyes	23	24	17	17	23	40
Width (mm)	7.6 ± 0.27	7.9 ± 0.14	8.4 ± 0.17	11.1 ± 0.16	9.9 ± 0.45	11.7 ± 0.41
Length (mm)	3.3 ± 0.06	12 ± 0.31	20.2 ± 0.09	4.6 ± 0.23	4.8 ± 0.24	4.3 ± 0.12
Weight (mg)	13.5 ± 1.9	117.4 ± 3.1	328.4 ± 23	337.9 ± 89.5	60 ± 7	50.4 ± 2.6

- LG in Cynomolgus monkeys was located in the superotemporal aspect of the globe and was easily assessed by rotating the eye nasally and elevating the superior palpebra. The mean weight was 50.4 ± 2.6 mg and measured 11.73 ± 0.41 mm by 4.25 ± 0.12 mm.

CONCLUSION

- The size and location of the LG in rats and rabbits make them unviable as a delivery route for new therapies.
- The size and location of the LG in swine and dogs make them challenging for direct delivery of new therapies.
- The size and location of the LG in NHPs make them ideal for direct delivery of new therapies.

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