

## Supplemental Table 1: Distribution of Papillomas

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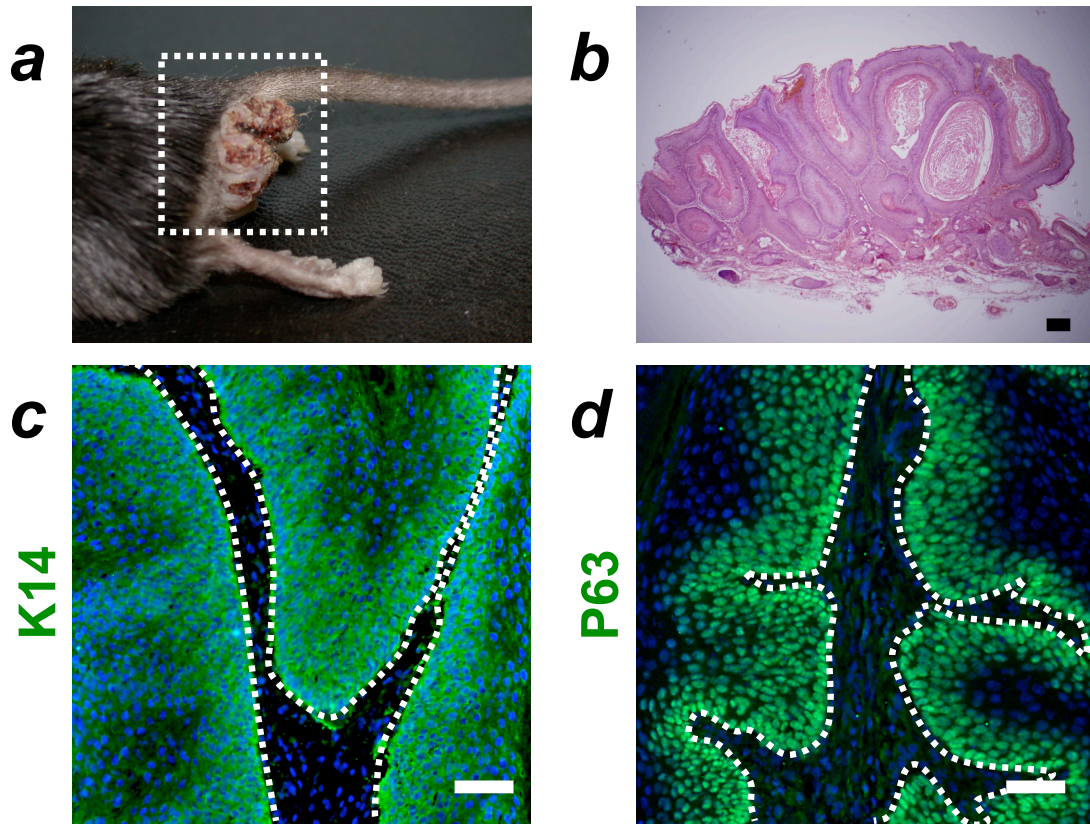
Site (n=22)	
Back	9%
Feet	44%
Eyelid	6%
Perianal	35%
Tail	6%

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20 of 27 *Msx2-Cre; Kras<sup>G12D</sup>* mice developed papillomas at one site.

1 of 27 *Msx2-Cre; Kras<sup>G12D</sup>* mice developed papillomas at two independent sites.

**Supplemental Figure 1. *Kras*-induced Spontaneous Perianal Papillomas**



**Supp. Figure 1. *Kras*-induced spontaneous perianal papillomas**  
(a) Highly penetrant perianal papillomas in *Msx2-Cre; Kras<sup>G12D</sup>* mice.  
(b) Low power histologic section of perianal papilloma and benign architecture. Scale bar (black) = 200  $\mu$ m. (c) K14 immunostain demonstrating lack of invasive epithelial cells. Dotted line denotes dermal-epidermal junction. Scale bar (white) = 50  $\mu$ m. (d) P63 immunostaining reveals intact epidermis without evidence of invasion.

**Supplemental Table 2**

	<u>Description</u>	<u>Age</u>	<u>wildtype</u>	<u>Kras<sup>G12D</sup></u>	
<b>Interfollicular epithelium (skin)</b>	Anterior-Posterior length ( <i>ratio of surface/base</i> )	P0-P5	1.015 ± 0.016 n=3	1.04 ± 0.011 n=4	p=0.582
		P10	1.013 ± 0.004 n=6	1.108 ± 0.032 n=5	p=0.004
	density ( <i>nuclei per 100µm</i> )	P0-P5	12.2 ± 0.3 n=7	13.4 ± 0.8 n=7	p=0.083
		P7-P10	13.3 ± 0.9 n=4	18.0 ± 1.7 n=5	p=0.016
	Ki67 (% nuclei positive)	P4-P10	27.8 ± 5.0 n=4	52.1 ± 6.7 n=6	p=0.0095
<b>Nail</b>	length in mm	P47	2.70 ± 0.09 n=3	2.41 ± 0.08 n=5	p=0.036

<u>Cre-mediated excision of LSL</u>	<u>Description Hair follicle (HF)</u>	<u>LSL product vs. GAPDH</u>
K15-Cre; Kras #1	Beta-gal positive HF	56.23 ± 8.12%
K15-Cre; Kras #2	Beta-gal positive HF	6.23 ± 0.98%
K15-Cre; Kras #1	Beta-gal negative HF	100.00 ± 17.35%
K15-Cre; Kras #2	Beta-gal negative HF	100.00 ± 20.91%
No LSL-Kras #3	Beta-gal negative HF, No Cre,	0.12%