



## FROM THE DOGRISK STUDY: CORRELATING THE PREVALENCE OF LIPOMAS IN DOGS WITH THEIR DIET AT THE AGE OF 2-8 MONTHS

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### Introduction

The etiology of lipomas is unclear (1,2).

Epidemiologic nutritional research on association between lipomas in dogs and food ingested between 2-8 months of age has not been looked at before.

### Materials and methods

Dog owners have been filling in data into the internet based DOGRISK food frequency questionnaire since 2009. Dogs with one or several owner-reported lipomas situated anywhere on the body was compared to dogs where owners reported no lipomas. The diets analyzed were ingested at the age of 2-8 months.



In the whole data the 54 food items were divided into raw protein foods, processed protein foods, mixed dairy products, raw greens, fruits and berries, human food leftovers and human type food served to dogs, raw bones, cooked/smoked bones, processed snacks, dried snacks, any type of supplemented oils, what dogs might eat outside, dry foods for dogs, and sausages or canned food for dogs, based on principal component analysis (PCA). Extreme groups looked at where eating the foods either never or maximum some times per year (=0) versus some times per week till daily (=1). "Some times per month" was left un-analyzed.

In a second cohort where all dogs were 6 years or older, the 54 food items were again divided

according to the PCA into raw animal protein foods; processed animal protein foods; mixed dairy products; raw greens, fruits and berries; human food leftovers; and dog food cooked for dogs; processed snacks; any type of vegetal or animal based oils; what dogs might eat outside; dry, sausages or canned food for dogs. Amounts looked at where either never or maximum some times per year (=0), some times per month (=1) and some times per week till daily (=2).

As non-diet variables age, sex, neutered or not, if mother dog had lipoma, body condition score (BCS), were analyzed. Logistic regression with  $p < 0.05$  was considered significant.

### Results

167 dogs with lipomas versus 1843 dogs without any lipomas were included in the first analyses. In the unadjusted multivariate food group analyses, the mixed dairy variable including milk, dairy products, ice-cream and cheese were significantly and positively associated with dogs having more lipomas at an older age,  $OR=1.4$  (95% CI 1.0-1.9;  $p=0.049$ ). Raw bones/meaty bones showed a significant inverse associations with lipomas  $OR=0.39$  (95% CI 0.25-0.61;  $p < 0.0001$ , possibly indicating a protective effect. None of the other variables showed a significant association with lipomas.



In the analyses with dogs 6 years or older, 277 dogs with lipomas versus 812 dogs without

lipomas were analyzed. With only diets in the final logistic regression model the processed animal protein foods  $OR=1.4$  (95% CI 1.0-1.9;  $p=0.035$ ), human food leftovers  $OR=1.9$  (95% CI 1.1-3.3;  $p=0.028$ ), and processed snacks  $OR=2.4$  (95% CI 1.1-4.9;  $p=0.022$ ) were positively associated with lipomas while raw animal protein foods  $OR=0.6$  (95% CI 0.4-0.9;  $p=0.005$ ) were negatively associated with lipomas in dogs.

However, when the non-diet related variables age, sex, neutered or not, if mother dog had a lipoma, and BCS were included in the model, no diet related association remained significant. Only higher age and a mother having had the same disease, remained positively associated with lipomas.

### Conclusions and clinical relevance

*As the mother dogs probably had a similar diet to their puppy dogs that were analyzed here, it is possible that the puppy dogs similar disease also was due to the same diet and not DNA. This data may thus indicate that there still might be an association between diet and lipoma. The age factor is known and strong (1,2). More epidemiology and diet intervention studies are needed.*

### References

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- (2) Mukaratirwa S, Chipunza J, Chitanga S, Chimonyo M, Bhebhe E. Canine cutaneous neoplasms: prevalence and influence of age, sex and site on the presence and potential malignancy of cutaneous neoplasms in dogs from Zimbabwe. *J S Afr Vet Assoc.* 2005 Jun;76(2):59-62.

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