factors and overweight at adulthood in a population of pure breed Labradors.

Materials and methods: The data collection was conducted on dogs born within the same French breeding kennel (CESECAH, Lezoux, France). For each dog, information about neonatal period (birth weight, growth rate between birth and Day 2 and between Day 2 and Day 21) was recorded throughout a questionnaire. General information about dogs (sex, age, sterilization status, "Food motivation" score (4) ...), their life style (age of owner, walking duration per day...) was also recorded. Body condition score (BCS) was evaluated using the 9-point scale (5). After univariate analyses, only parameters with p-value lower than 0.20 or parameters with biological relevance were kept for multivariate analysis model, i.e. sterilisation (Yes/No), age of owner, "Food motivation" score, birth weight and growth rates (between birth and Day 2 and between Day 2 and Day 21). A generalized linear model was then fitted to determine factors affecting overweight (BCS > 6).

Results: A total of 85 Labradors (20 males and 65 females) raised under similar environmental conditions until two months of age were included in the present study. Dogs were from 6 months to 13 years of age (median: 3.8 years). The overall prevalence of overweight (BCS > 6) was 44% (95% confidence interval, 95% CI: 32–56). The main risk factor was the neutering (p = 0.009; relative risk RR: 3.5, CI: 1.8–7.1). For neutered dogs (males and females, n = 28), growth rate between 2 and 21 days was significantly associated with overweight (p < 0.001). Birth weight and "Food motivation" score tended to be significant (p = 0.079 and 0.074 respectively). Neutered dogs with a 2–21 days growth rate over 248% or a birth weight under 415 grams were at higher risk of overweight at adulthood than others (RR: 2.1, CI: 1.1–4.3 and RR: 1.7, CI: 0.8–3.8, respectively). A "Food motivation" score in the lowest values (low food-motivation) increased the risk of overweight.

Conclusions: These results suggest an influence of neonatal factors on the risk of overweight in addition to adult factors. Low birth weight puppies with high 2–21 days growth rate could be more susceptible to become overweight. More studies are needed to explore this relationship, to identify early-life predictive factors for canine overweight and obesity and to quantify the relative impact of early risk factors and environmental factors. These findings should help to reduce the current high prevalence of overweight and thus to improve health and welfare of companion dogs throughout an early management of puppies (from birth).

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018 | Kitten growth from birth to two months of age: breed-specific curves

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Introduction and aim: Weight-for-age charts are commonly used to evaluate pediatric development of infants (1). Deviation from a "normal" trajectory is associated with an increased risk of morbidity and mortality (2). Effective growth monitoring, a simple and easy-to-use tool for health management, requires accurate plotting on appropriate charts. Such curves are to date not available for kittens during the period they are raised by their breeder, i.e. from birth to the age of two months. The purpose of the present study was to draw reference growth curves in the feline species. Due to body-weight variability between feline breeds, data were plotted by breed.

Materials and methods: Purebred kittens were weighed by breeders from birth to two months of age (with various scales) and data were transmitted retrospectively on a voluntary basis and entered into an Excel file. Only kittens born in French catteries and declared alive at two months of age were included into the analysis. First, growth was described through seven parameters: weight at birth (D0), at D2, at D21 and at D60 and growth rates calculated between D0 and D2, between D2 and D21 and between D21 and D60. These seven parameters were compared between breed using the Kruskal-Wallis test and the Wilcoxon signed rank-test with Bonferroni correction. Then, breed-specific reference growth curves were drawn in two steps. First, box-and-whisker plots allowed to describe the weight at 14 different dates (D0, D1, D2, D4, D7, D10, D14, D21, D28, D35, D42, D49, D56, D60). Then, the weight values were fitted by a second-degree polynomial function, giving smoothed growth curves. On each graph, 13 parameters were represented: the median, the two quartiles, the eight remaining deciles and centiles 5 and 95.

Results: In total, 3639 kittens from 1010 litters were included. Twelve different breeds were represented: Abyssinian/Somali, Bengal, Birman, British group, Chartreux, Egyptian Mau, Maine Coon, Norwegian Forest, Oriental group, Persian group, Ragdoll and Siberian. The number of kittens included ranged from 101 to 640 per breed (median: 162). The number of litters per breed ranged from 27 to 199 (median: 60). The cattery of origin was known for 94% of kittens and 130 catteries were represented. The studied population included 1419 females and 1640 males (sex ratio: 1.2; 580 kittens with unknown sex). A significant breed effect was evidenced on all growth parameters (p-value < 0.001): birth weight ranged from 87 g (mean in Abyssinian/Somali) to 119 g (Maine Coon); weight at D60 ranged from 853 g (Oriental group) to 1174 g (Maine Coon); growth rate between D0 and D2 ranged from 16% (Birman) to 30% (Abyssinian/Somali); growth rate between D2 and D21

ranged from 174% (Chartreux) to 239% (Egyptian Mau). In contrast, growth patterns were similar between breeds with a quasi-linear curve. Differences in slopes combined with statistical differences in growth rates between breeds suggested that kitten growth description requires breed-specific reference growth curves described in this work.

Conclusions: These curves provide practical tools to breeders of twelve breeds for kitten follow-up. More data are needed to increase the precision of these twelve curves, to define reference growth curves for the numerous remaining breeds and to compare feline growth across different countries.

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019 | A single GnRH-antagonist treatment affects testicular expression of Steroidogenic Acute Regulatory protein (StAR) and steroidogenic enzymes in dogs

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Introduction and aim: Gonadotropin-releasing hormone (GnRH)-antagonists can suppress the production of gonadotropins from the pituitary gland. This results in a decreased production of testosterone and an impaired spermatogenesis in the testis. Therefore, GnRH-antagonists may have future potential for reproduction control in dogs (1). Steroidogenic acute regulatory protein (StAR) and steroidogenic enzymes are important factors for the synthesis of testosterone in the testis (2). However, the effect of GnRH-antagonist treatment on these factors has not been studied in dogs yet. This study investigates how a single treatment with the GnRH-antagonist acyline affects the expression of StAR and the steroidogenic enzymes cytochrome P450 side-chain cleavage (P450scc) and cytochrome P450 17α-hydroxylase/17,20-lyase (P450c17).

Materials and methods: Testicular tissues from nine clinically healthy and sexually mature male dogs (4–6 years, 8–11 kg) were included. Four dogs were treated SC with a single injection of acyline (330 µg/kg) and castrated surgically 14 days after the treatment (AG; n = 4). The remaining dogs served as a control group (CG; n = 5) and were castrated right after a clinical examination and semen collection/evaluation. Bouin's solution fixed and paraffin embedded testicular tissue was used to study the expression of StAR, P450scc and P450c17 by immunohistochemistry. Light microscopy was used to evaluate spermatogenesis and to determine the localization of immunopositive cells. By use of the digital image processing program ImageJ (https://imagej.net/Fiji), the percentage immunopositive area (PIA) and the intensity of the immunohistochemical staining (mean grey scale, MGS-value) in the interstitial compartment were calculated. Additionally, the prevalence of immunopositive peritubular cells was calculated in each sample by evaluation of 200 peritubular cells.

Results: Treatment resulted in a spermatogenic arrest. In regards to steroidogenesis, StAR, P450scc and P450c17 protein expression in Leydig cells was significantly affected 14 days after the treatment with acyline ($p < 0.05$). PIA was significantly lower for treated dogs compared to controls (StAR: $p < 0.05$; P450scc and P450c17: $p < 0.01$) and so was the MGS-value (StAR: $p < 0.001$; P450scc: $p < 0.01$; P450c17: $p < 0.05$). The mean prevalence of immunopositive peritubular cells was 1.0, 4.9 and 9.5% for StAR, P450scc and P450c17, respectively, in CG and 0.1, 0.9 and 1.6% in AG. Treatment resulted in a significant downregulation in the prevalence of immunopositive peritubular cells in the stainings for P450scc and P450c17 ($p < 0.01$).

Conclusion: The results of our study indicate that the entire steroidogenic cascade in the Leydig cells is downregulated after treatment with acyline resulting in a disruption of spermatogenesis.
The expression of StAR, P450scc and P450c17 in some of the peritubular cells indicates that these cells might be Leydig cell progenitors. To the knowledge of the authors, this has not previously been shown in dogs.

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021 | Breeders' chilling, a valuable option to cryopreserve dog semen collected in field conditions.

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Introduction and aim: Cryopreservation of dog semen is the best option for breeders to store or ship the genetic material of valuable individuals, but this service is usually only available in some specialized centers. In field conditions, as in local breeding kennels, small clinical practices or during expositions, the unavailability of specific equipment and liquid nitrogen makes freezing procedures unfeasible and breeders ask to collect the semen *in loco* and ship it cooled

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