Toxoplasma gondii: sources of infection in Switzerland ("meat versus cat")

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Key words
Pig, cattle, sheep, cat, Toxoplasma gondii, P30-ELISA, seroprevalence, PCR, prevalence, genotyping.

Aim of the study
The aim of the present investigation was to actualise the epidemiological data on the distribution of T. gondii in animals slaughtered for meat consumption (intermediate hosts) and in cats (definitive hosts). Compared to a previous study we published in 2000, we added new parameters including different housing systems for fattening pigs (outdoor versus indoor), and the determination of the genotypes of T. gondii detected in different hosts.

Material and methods
Meat samples of three animal species were included in the study: bovines (calves, young bulls, heifers, cows), sheep (lambs, ewes) and pigs (indoor fattening pigs, breeding sows, fattening pigs with outdoor/pasture access, wild boars). Cats were assessed for oocyst-excretion. The number of animals per group was calculated upon WinEpiscope 2.0 and based on the (sero)prevalences determined in a previous study published in 2000. Access to slaughtered animals (n=1,076) was provided by Swiss abattoirs. In parallel, commercially available fresh meat samples (n=340) were purchased from butchers and supermarkets. Cat faeces were collected in different animal shelters (n=252).
Methodically, the study was based on serology (P30-ELISA with meat juice) and species-specific RT-PCR for meat tissue samples as well as coprology (Flotation) and RT-PCR (on oocyst-positive samples) for feline faecal specimen. With every PCR-positive sample, a specific PCR for genotyping and, in case of meat samples, a histological examination was performed.

Results and significance
Compared to the previous study published in 2000, the recent results demonstrated a significant increase in the overall seroprevalence for (a) young bulls and cows and (b) fattening pigs, whereas all other groups remained at a similar seroprevalence level. The increase in (a) and (b) could be associated to changes in mode of husbandry. Detectability of parasite DNA by PCR was significantly higher for calves, whereas the DNA-prevalence in all other animal groups remained statistically unchanged. In cats, the prevalence determined for T. gondii-oocyst excretion was of 0.4%.
Conclusively, the risk of infection for a human being is still born out of two different sources, including on one hand meat from predominantly sheep and pigs, on the other hand cats upon their faecal contamination of food and environment. For both sources, the risk has not decreased, but remains either persisting or has even increased when compared to 10 years ago.

Publications, posters and presentations
Berger-Schoch, A. (2009) Toxoplasma gondii: Potenzielle tierische Infektionsquellen in der Schweiz. Dissertation, Vetsuisse Fakultät, Universität Bern.
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Berger-Schoch, A.E. et al (2011) Prevalence and genotypes of Toxoplasma gondii in feline faeces (oocysts) and meat from sheep, cattle and pigs in Switzerland. VeterinaryParasitology 177, 290–297.

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