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## **Does vertical transmission play a role in the generating the high prevalence and ubiquity of *Toxoplasma gondii* in natural populations of humans and animals?**

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With a ubiquitous dispersion and high prevalence in natural populations of animals and humans, the distribution of the parasite *Toxoplasma gondii* is puzzling. Despite the cat being the only definitive host, *Toxoplasma* is found in most geographical areas and all warm blooded animals. Three routes of transmission are typically recognised: ingestion of oocysts shed by the cat, carnivory and congenital transmission. The relative importance of these routes is poorly understood in natural populations. These studies aim to assess the contribution of congenital/vertical transmission to these processes. Using PCR detection of the parasite in foetuses, overall congenital transmission rates in natural populations of infected mice were found to be high (*Mus domesticus*, 100%; *Apodemus sylvaticus*, 100%). Studies in lambs, using PCR detection of *Toxoplasma* in umbilical cord tissue at birth, showed that congenital transmission occurred in 69% of pregnancies. Infection and abortion in families of pedigree sheep from the same farm was investigated to test the hypothesis of vertical transmission. If infection occurred by ingestion of oocysts, a random distribution of infection across families would be expected. We found highly significantly different prevalences of *Toxoplasma* infection ( $p < 0.01$ ) and abortion ( $p < 0.01$ ) in different families. Furthermore, analysis of pedigrees suggested serial congenital infection from some infected ewes. In humans, we found 9.93% congenital transmission rates using PCR amplification of parasite DNA from umbilical cord. This is much higher than previously published data. However, this study, showed no link between infection and miscarriage in humans. We propose that vertical transmission may be much more important than previously thought, may contribute to the high prevalence seen in natural populations of mammals (including humans) and deserves further consideration.

### **Biography**

Geoff Hide is currently Professor of Parasitology at the University of Salford in the UK. He received his PhD degree in Molecular Parasitology from the University of Edinburgh (1988) and conducted Postdoctoral Research at the Wellcome Trust Centre for Molecular Parasitology at the University of Glasgow.

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