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Men, Mice and Maltese Crosses

Discovery and Implications of *Babesia microti* in Australia

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**Babesiosis**

Vector-borne protozoal disease
- Vectors: Ticks
- Vertebrate hosts: Mammals (and birds)

Highly adapted host-vector-pathogen ecologies
- Wildlife and domesticated animals

**In Australia**

**Introduced:**
- Bovine babesiosis
  - *B. bovis*
  - *B. bigemina*

**Canine babesiosis**
- *B. canis vogeli*
- *B. gibsoni*

**Native animals:**
- Approx. 10-15 *Babesia* and *Theileria* parasites recorded from marsupials:
  - Limited data and virtually no molecular taxonomy
Zoonotic Babesiosis

Emerging disease

*B. microti*
- Diverse species complex
- Northern Hemisphere distribution
  - USA – Europe – Asia
- *Ixodes* spp. tick vectors
- Small mammal (rodent) hosts

*B. divergens* (Europe & USA)
*B. venatorum* (Europe)
*B. duncani* (USA)
*B. conradae* (USA)
And others...
Zoonotic Babesiosis in Australia

Diagnosed in Canberra, the patient had lived on the **south coast of NSW** for many years.

Identified as *Babesia microti*

**Morphology**

18S rRNA gene sequence

No history of travel to endemic regions, no prior blood transfusion and no IV drug use.

**Where did the organism originate?**

**How was this man infected?**
Zoonotic Babesiosis in Australia – how?

1. Tick from North America?
2. Australian tick(s)?
   (e.g. *Ixodes holocyclus, I. tasmani*)

Vertebrate (mammal) reservoir?
1. Introduced (alien) rodents
   (e.g. black rats, Norwegian rats)
2. Native rodents
   (e.g. bush rats, swamp rats)
3. Small marsupials
   (e.g. *Antechinus*)

Infected “recently” with *B. microti*
Zoonotic Babesiosis in Australia – Possible Implications

If a N. American tick – minimal implications
If a true autochthonous infection:

• Locally established in certain ecological niches?
  • Is it one of the Babesia/Theileria parasites previously described?

• Is it causing other (undiagnosed) cases of tick-transmitted babesiosis?
  • e.g. fever, malaise, headache, chills, splenomegaly

• May it represent a risk of transfusion-transmitted babesiosis (TTB)?
  • Most common transfusion-transmitted infection reported to FDA

• May be co-transmitted with other tick-borne pathogens such as Rickettsia and others not yet confirmed but increasingly suspected?
  • Anaplasma spp. (A. phagocytophilum → human granulocytic anaplasmosis)?
  • Ehrlichia spp. (E. chaffeensis & E. ewingii) → human ehrlichiosis?
  • Borrelia spp. → Lyme borreliosis?
Future Directions?

• Many questions and speculation: more evidence is required

• Tick-borne disease in Australia requires new research!

Acknowledgement is given to all involved in the reporting of *B. microti* in Australia.