

Abstract

The Current Status of Human Babesiosis Worldwide

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Babesiosis is a zoonotic disease caused by an infection with the intraerythrocytic parasite *Babesia* spp. To date, four species are known to cause human babesiosis: *Babesia microti*, *Babesia divergens*, *Babesia duncani*, and *Babesia venatorum*. Although most of the human babesiosis has been reported in the United States and Canada, cases including infections with a new species (*Babesia crassa*-like) have increased in China recently. In Korea, two indigenous human babesiosis was reported. Recent survey performed by KDCA revealed *Babesia* parasites in ticks on wild rodents of Korea, and possible appearance of human babesiosis in Korea should be warned. As human babesiosis is an emerging and increasing tick-borne disease worldwide, we suggest that more studies need to be conducted on ticks and *Babesia* sp.

Keywords: *Babesia* spp., Human babesiosis, Tick, Zoonotic disease

Table 1. Number of human babesiosis worldwide (2020)

Country (No. of case)	Babesia sp. (No. of infection)
Africa	
Equatorial Guinea (1)	<i>B. microti</i> (1)
Asia, Oceania	
China (125)	<i>B. microti</i> (16), <i>B. divergens</i> (1), <i>B. venatorum</i> (49), <i>Babesia</i> sp. CN1 (1), <i>B. crassa-like</i> sp. (58)
Korea (2)	<i>Babesia</i> sp. KO1 (1), Other species (1)
Japan (1)	<i>B. microti</i> (1)
Australia (2)	<i>B. microti</i> (1), <i>B. duncani</i> (1)
Europe	
Austria (3)	<i>B. microti</i> (1), <i>B. venatorum</i> (2)
Belgium (1)	<i>B. microti</i> (1)
British Isles (6)	<i>B. divergens</i> (6)
Czech (1)	<i>B. microti</i> (1)
Croatia (1)	Other species (1)
Finland (1)	<i>B. divergens</i> (1)
France (13)	<i>B. divergens</i> (11), Other species (2)
Germany (2)	<i>B. microti</i> (1), <i>B. venatorum</i> (1)
Italy (1)	<i>B. venatorum</i> (1)
Norway (1)	<i>B. divergens</i> (1)
Poland (1)	<i>B. microti</i> (1)
Russia (1)	<i>B. divergens</i> (1)
Slovenia (1)	<i>B. crassa</i> (1)
Spain (5)	<i>B. divergens</i> (2), <i>B. microti</i> (1), Other species (2)
Sweden (1)	<i>B. divergens</i> (1)
Switzerland (1)	<i>B. divergens</i> (1)
Turkey (2)	<i>B. divergens</i> (2)
America	
Canada (1,121)	<i>B. duncani</i> (1,120), <i>B. microti</i> (1)
Mexico (4)	<i>B. microti</i> (4)
United States (24,381)	<i>B. microti</i> (24,363), <i>B. duncani</i> (14), <i>B. divergens</i> (4)
Ecuador (1)	<i>B. microti</i> (1)

Table 2. Regional distribution of *Babesia*-transmitting tick species

Region	Babesia species	Tick species
Asia	<i>B. crassa</i> -like	<i>Ixodes persulcatus, Haemaphysalis concinna</i>
	<i>B. microti</i>	<i>I. persulcatus, I. ovatus</i>
	<i>B. venatorum</i>	<i>I. persulcatus</i>
	<i>Babesia</i> sp. KO1	<i>Ixodes</i> sp.
Europe	<i>Babesia</i> sp. CN1	<i>Ixodes</i> sp.
	<i>B. divergens</i>	<i>I. ricinus</i>
	<i>B. microti</i>	<i>I. ricinus</i>
	<i>B. venatorum</i>	<i>I. ricinus</i>
United States	<i>B. microti</i>	<i>I. scapularis</i>
	<i>B. duncani</i>	<i>Dermacentor albipictus</i>
	<i>B. divergens</i> -like	<i>Ixodes</i> sp.

Table 3. Identification of *Babesia* spp. in ticks on wild rodents in Korea

Rodents (No.)	Babesia-positive ticks	Babesia species
<i>Apodemus agrarius</i> (155)	<i>I. nipponensis</i> (11.7%, 31/265)	<i>B. microti</i> (93.9%)
<i>Crocidura lasiura</i> (17)	<i>I. angustus</i> (11.46%, 11/96)	Other <i>Babesia</i> spp. (6.1%)
<i>Tscherskia triton</i> (1)	<i>Ixodes</i> sp. (7.1%, 54/766) <i>H. longicornis</i> (14.3% 2/14)	
Total 173	Total 8.6%, 98/1,141	