Disease caused by insect bites can be transmitted to children at birth

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A North Carolina State University researcher has discovered that bacteria transmitted by fleas-and potentially ticks-can be passed to human babies by the mother, causing chronic infections and raising the possibility of bacterially induced birth defects.

Dr. Ed Breitschwerdt, professor of internal medicine in the Department of Clinical Sciences, is among the world's leading experts on *Bartonella*, a bacteria that is maintained in nature by fleas, ticks and other biting insects, but which can be transmitted by infected cats and dogs as well. The most commonly known *Bartonella*-related illness is cat scratch disease, caused by *B. henselae*, a strain of *Bartonella* that can be carried in a cat's blood for months to years. Cat scratch disease was thought to be a self-limiting, or "one-time" infection; however, Breitschwerdt's previous work discovered cases of children and adults with chronic, blood-borne *Bartonella* infections-from strains of the bacteria that are most often transmitted to cats (*B. henselae*) and dogs (*B. vinsonii subsp. berkhoffii*) by fleas and other insects.

In his most recent case study, Breitschwerdt's research group tested blood and tissue samples taken over a period of years from a mother, father and son who had suffered chronic illnesses for over a decade. Autopsy samples from their daughter-the son's twin who died shortly after birth-contained DNA evidence of *B. henselae* and *B. vinsonii subsp. berkhoffi* infection, which was also found in the other members of the family.

Both parents had suffered recurring neurological symptoms including headaches and memory loss, as well as shortness of breath, muscle weakness and fatigue before the children were born. In addition, their 10-year-old son was chronically ill from birth and their daughter died due to a heart defect at nine days of age.

Results of the parents' medical histories and the microbiological tests indicated that the parents had been exposed to *Bartonella* prior to the birth of the twins, and finding the same bacteria in both children, one shortly after birth and the other 10 years later, indicates that they may have become infected while in utero.

Breitschwerdt's research appears online in the April 14 *Journal of Clinical Microbiology*.

"This is yet more evidence that *Bartonella* bacteria cause chronic intravascular infections in people with otherwise normal immune systems, infections that can span a decade or more," Breitschwerdt says. "Also this new evidence supports the potential of trans-placental infection and raises the possibility that maternal infection with these bacteria might also cause birth defects."

The Department of Clinical Sciences is part of NC State's College of Veterinary Medicine. Dr. Breitschwerdt is also an adjunct professor of medicine at Duke University Medical Center.

More information: "Molecular evidence of perinatal transmission of Bartonella vinsonii subsp. berkhoffii and B.henselae to a child" Authors: Edward B. Breitschwerdt, Ricardo G. Maggi and Patricia E. Mascarelli, NC State University; Peter Farmer, Department of Pathology, North Shore University Hospital. Published: April 14, 2010 in Journal of Clinical Microbiology

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