Crimean-Congo Hemorrhagic Fever: A Tick-Borne Killer

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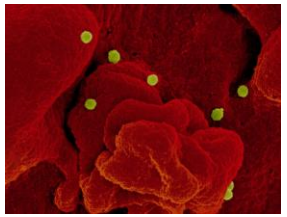
CSP SCIENCE

Background

What is CCHF?

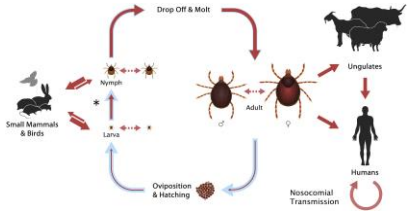
- Crimean-Congo Hemorrhagic Fever (CCHF) is a tick-borne disease.
- *Hyalomma* ticks are the most common reservoir and vector of CCHF. *Hyalomma* ticks can be found in Asia, Europe and Africa.
- Its name emerged after being first exposed in Crimea in 1944 and later detected in Congo in 1969.



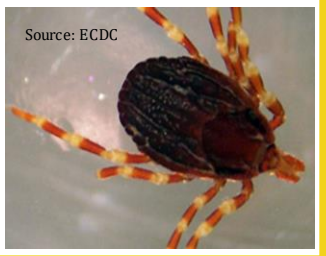
NIAID: Electron micrograph of Crimean-Congo hemorrhagic fever (CCHF) viral particles (yellow) budding from the surface of cultured epithelial cells from a patient.

Transmission

- Ticks are not very mobile on their own, but with the help of host animals, they can travel long distances.
- According to the ECDC, *Hyalomma* ticks can sense vibration, visual object, CO2, ammonia, body heat and other signals which allows the ticks to find a host animal.
- Human transmission occurs from a bite of an infected tick or contact with bodily fluids.
- People may be asymptomatic, however some cases may be severe with development of hemorrhage (within 3-6 days)

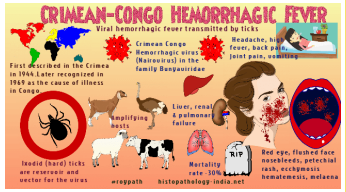


Source: Aysen Gargili et al.



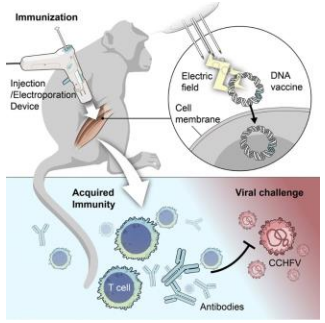
Symptoms

- According to the CDC, initial symptoms of CCHF include; headache, high fever, body pain, vomiting, red eyes and throat and petechia.
- Later stages of CCHF leads to severe bruising, and uncontrolled bleeding.
- Symptoms can last about 14 days.
- According to the CDC mortality rate is 40%



Vaccine Research

- According to Appleberg, Nucleoside-modified mRNA vaccines were tested in mice to protect them from CCHFV infection. Results showed successful protection in IFNA mice, suggesting potential use in humans.
- Research by Atim et al. aimed to collect blood & tick samples from farm cattle and goats to test for antibodies & antigens (ELISA) after an infected human case. IgG antibodies were identified
- Blood/blood supply offered for treatment, as well as meropenem, tranexamic acid, and ribavirin
- The antibodies that your body makes to combat the CCHF disease are IgM and IgG, however, they are very low levels
- Ribavirin is drug that is a broad Anti-RNA virus inhibitor. This antiviral inhibitor was used on mice to see its efficiency. The study concluded that there was 80% efficiency using Ribavirin, however, other experiments conducted say otherwise
- Even though it's important to find the vaccine for humans it's even more important to find the vaccine for animals too like livestock.



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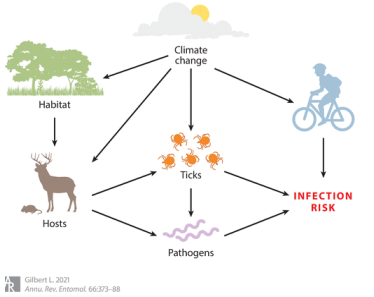
Future of CCHF

- The spread of agricultural land is a risk factor for population increase of *Hyalomma* ticks.
- Southern Europe and North Africa- decrease in rainfall during the summer will push ticks towards northern latitudes.
- In other regions, warmer falls will allow for the growth of larger tick populations.
- Climate-related changes to habitats, hosts and human behavior impact the risk of exposure to tick-borne pathogens. (Annu. Rev. Entomol)



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