Onchocerciasis (River blindness)

Onchocerciasis, or river blindness, is a neglected tropical disease (NTD) caused by the parasitic worm known as *Onchocerca volvulus*. It is transmitted through a bite by blackflies belonging to the genus *Simulium*.

Onchocerciasis is known as river blindness because the blackfly that transmits the infection lives and breeds near fast-flowing streams and rivers, mostly near remote rural villages. The infection can result in visual impairment and sometimes blindness.

Additionally, onchocerciasis can cause skin disease, including intense itching, rashes, or nodules under the skin. Worldwide onchocerciasis is second only to trachoma as an infectious cause of blindness.

Onchocerciasis is a vector-borne disease, where human beings are the only natural vertebrate host. The disease was previously endemic in many countries; however great progress has been made in interrupting transmission of Onchocerca volvulus.

Epidemiology of onchocerciasis?

Onchocerciasis is locally transmitted in 31 countries of Africa and in foci in Yemen and South America. The list of 31 African countries can be found on the World Health Organization (WHO). Four countries have been verified by the World Health Organization as free from onchocerciasis: Colombia, Ecuador, Mexico, and Guatemala. Only a single small transmission zone remains in South America, crossing the border between the Bolivarian Republic of Venezuela and Brazil.

Onchocerciasis in casual travelers is rare; the infection is transmitted in remote rural areas and, unlike malaria, contracting onchocerciasis often requires more than one infectious bite. Thus, the risk of infection is greater in adventure travelers, missionaries, Peace Corps, and other long-term volunteers who are likely to have more intense or sustained exposure to blackfly bites. Given the low rate of transmission in the Americas, the likelihood is very low that any travelers in this region (even missionaries and long-term volunteers) would ever get infected.

How is onchocerciasis spread?

The disease spreads by the bite of an infectious blackfly.

When a blackfly bites a person who has onchocerciasis, microscopic worm larvae (called microfilariae) in the infected person's skin are ingested by the blackfly. The larvae develop over approximately one week in the fly to a stage that is infectious to humans. An infectious blackfly will typically drop larvae when biting a person. The larvae then penetrate the skin to infect the person.

Because the worms reproduce only in humans but need to complete some of their development inside the blackfly, the intensity of human infection (number of worms in an individual) is related to the number of infectious bites sustained by an individual. Blindness is usually seen in the setting of

longstanding and intense infection.

Who is most at risk for onchocerciasis?

Those most at risk are people who live or work near rapidly flowing streams or rivers where there are *Simulium* blackflies, followed by long-term missionaries, Peace Corps volunteers, field researchers, and other long-term travelers who are at greater risk for being bitten multiple times by blackflies infected by the parasite.

The disease is most intensely transmitted in remote rural African agricultural villages which are located near rapidly flowing streams and rivers.
Most of the areas where the blackflies are found are rural agricultural areas in sub-Saharan Africa in the countries mentioned previously. Usually, many bites are needed before becoming infected.

What are the clinical manifestations of onchocerciasis?

Infected persons may be without symptoms.

Those with symptoms will usually have one or more of the three manifestations: skin rash (usually itchy), eye disease, and nodules under the skin. The most serious manifestation consists of lesions in the eye that can lead to visual impairment and blindness.

How soon after infection will I have symptoms of onchocerciasis?

After a blackfly bite, it can take up to 12–18 months for the larvae to develop into mature adult worms inside the human body that are capable of mating and producing new larvae (also called microfilariae) that can be found in the skin. Each adult female worm, which can live approximately 10–15 years, can produce millions of new larvae during her lifetime.

As it is the larvae that cause most of the symptoms of onchocerciasis, most people infected with *O. volvulus* feel well until after the adult worms start producing large numbers of new larvae.

What is the treatment for onchocerciasis?

There are treatments, such as ivermectin, available to kill the larvae in your body and thus prevent the symptoms of the disease, such as skin rash and blindness.

Promising treatments, such as doxycycline, to kill adult worms are currently being studied. You should discuss your treatment options with your health care provider.

How can I prevent onchocerciasis?

Blackflies bite during the day. The best prevention is avoiding being bitten by infected blackflies by

using insecticides that contain N, N-Diethyl-meta-toluamide (DEET) on exposed skin, wearing long sleeve shirts and pants, and wearing permethrin-treated clothing.