ONCHOCERCIASIS IN AFRICA

A Neglected Tropical Disease

WHAT IS IT?

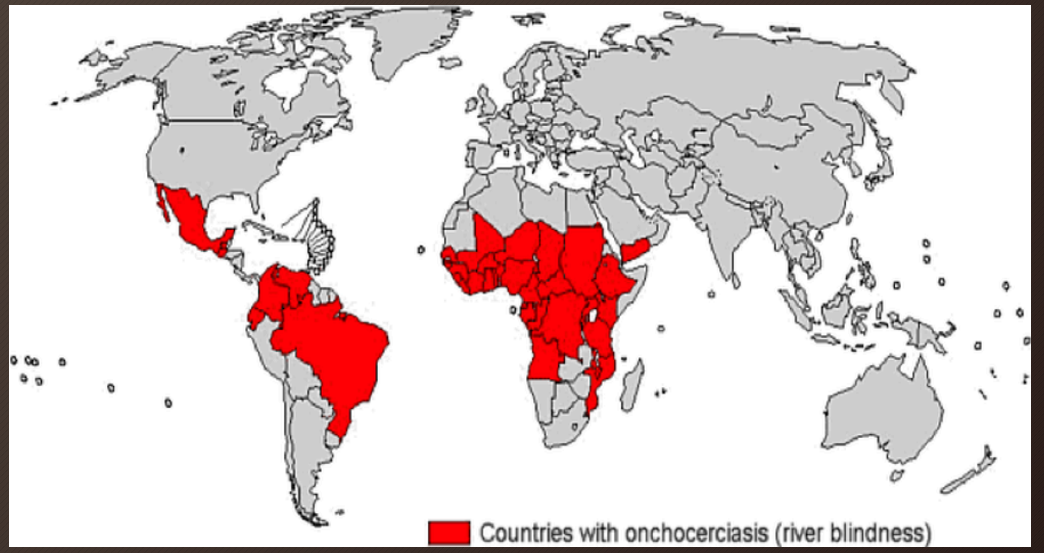
- Onchocerciasis, or River Blindness, is a neglected tropical disease (NTD) caused by the parasitic worm Onchocerca volvulus. It is transmitted through repeated bites by blackflies of the genus Simulium. The disease is called River Blindness because the blackfly that transmits the infection lives and breeds near fast-flowing streams and rivers and the infection can result in blindness. In addition to visual impairment or blindness, onchocerciasis causes skin disease, including nodules under the skin or debilitating itching. (WHO, 2016).
- *Worldwide onchocerciasis is second only to trachoma as an infectious cause of blindness.*

MONSTERS INSIDE OF ME

- http://www.animalplanet.com/tv-shows/monsters-inside-me/videos/river-blindness/

GLOBAL OVERVIEW

- Approximately 50% of men over the age of 40 years have been blinded by onchocerciasis (WHO, 2016a)
- The distribution of Onchocerciasis is closely linked to the distribution of its black fly vector (WHO, 2016a).
- Onchocerciasis has been officially eliminated in Colombia, Ecuador, and Mexico between 2013-15 (Carter, 2016). Interruption of transmission was declared in Guatamala in 2015, but won't be considered officially eliminated until mid-2016 (WHO, 2016b).



AFRICA OVERVIEW

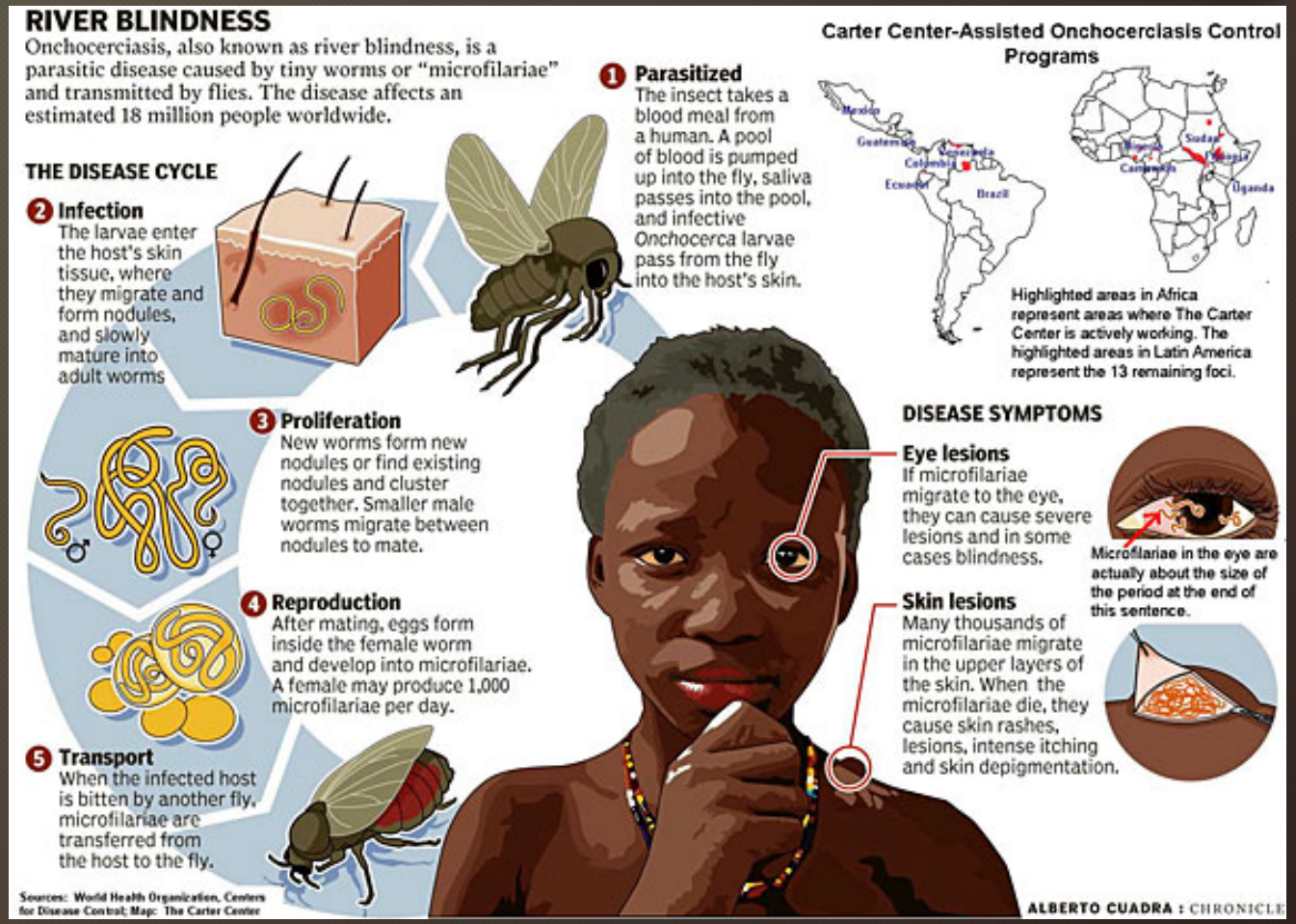
SUB-SAHARAN AFRICA PREVALANCE

- Approximately 99% of all onchocerciasis cases in the world occur in Africa, with 91% living in sub-Saharan Africa (WHO, 2016b).
- WHO has estimated that from 1995-2008:
- 26 million people are infected
- 265,000 have gone blind
- 746,000 people are visually impaired due to onchocerciasis (USAID's, 2014).

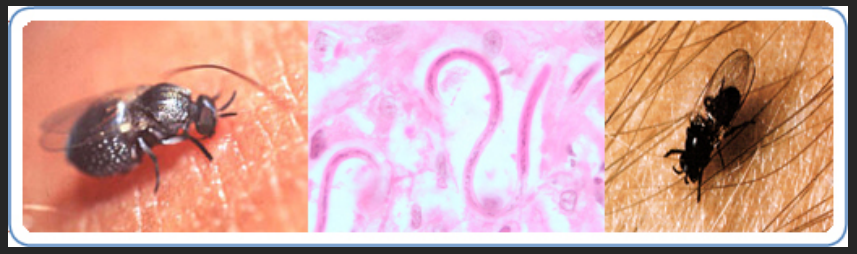
SUSTAINABLE DEVELOPMENT GOALS

- No Poverty
- No Hunger
- Good Health
- Good Jobs and Economic Growth
- Reduced Inequalities
- Sustainable cities and Communities
- Life on Land
- Partnerships for the goals

LIFE CYCLE

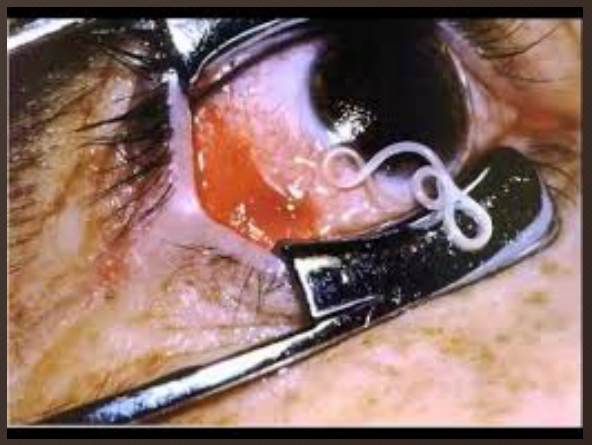

RIVER BLINDNESS
Onchocerciasis, also known as river blindness, is a parasitic disease caused by tiny worms or "microfilariae" and transmitted by flies. The disease affects an estimated 18 million people worldwide.
THE DISEASE CYCLE
1 Parasitized
The insect takes a blood meal from a human. A pool of blood is pumped up into the fly, saliva passes into the pool, and infective Onchocerca larvae pass from the fly into the host's skin.
2 Infection
The larvae enter the host's skin tissue, where they migrate and form nodules, and slowly mature into adult worms
3 Proliferation
New worms form new nodules or find existing nodules and cluster together. Smaller male worms migrate between nodules to mate.
4 Reproduction
After mating, eggs form inside the female worm and develop into microfilariae. A female may produce 1,000 microfilariae per day.
5 Transport
When the infected host is bitten by another fly, microfilariae are transferred from the host to the fly.
Carter Center-Assisted Onchocerciasis Control Programs
Mexico
Guatemala
Colombia
Ecuador
Brazil
Sudan
Uganda
Highlighted areas in Africa represent areas where The Carter Center is actively working. The highlighted areas in Latin America represent the 13 remaining foci.
DISEASE SYMPTOMS
Eye lesions
If microfilariae migrate to the eye, they can cause severe lesions and in some cases blindness.
Microfilariae in the eye are actually about the size of the period at the end of this sentence.
Skin lesions
Many thousands of microfilariae migrate in the upper layers of the skin. When the microfilariae die, they cause skin rashes, lesions, intense itching and skin depigmentation.
Sources: World Health Organization, Centers for Disease Control; Map: The Carter Center
ALBERTO CUADRA : CHRONICLE

SYMPTOMS



- Itchy skin
- Rashes
- Nodules under the skin
- Vision changes

- Skin reactions range from mild and local to generalized and intense itching that can lead to open sores and infections
- Eye lesions take many years of severe infection to develop (adults 30+) (USAID's, 2014)



ASPECTS

And how they relate to Onchocersciasis

CULTURAL

Beliefs, values, behaviors of people in Africa regarding social learning and how the culture contributes to Onchoceriasis in the region.

- challenges imposed by war, civil unrest and lack of political support in some endemic countries and districts;
- insufficient resources for achieving the ultimate treatment goals;
- slow socioeconomic development in some countries, which jeopardizes implementation of onchocerciasis-related health interventions; and
- limited sustainability of projects should the donation programm be terminated (IAPB, 2011)

ENVIRONMENTAL & ECONOMIC

How the geography, access, pollution, exploitation of resources impacts onchocerciasis infection rates in Africa

Cost/benefit ratio, employment, fiscal policy, production, distribution, and consumption of goods and services in Africa as it relates to onchocerciasis

- Sub-Saharan Africa weather is characterized by a wet summer season and dry winter season (Sub-Saharan, n.d.)
- The increased risk of blindness due to onchocerciasis infections has caused people to leave the rich river valleys for the less fertile upland country
- The result of this mass migration is decreased food production throughout the region, and overcrowding in highland communities (WHO, 2016a).

- Pressure of government officials to find a solution to the economic strife caused by migration due to fear of onchocerciasis (Araba, 2014)
- In the 1970's, the economic losses were approximately US$30 million (End Fund, 2016)
- Men experience the negative affects through 15% lower wages than those who haven't been affected (Ubachukwu, 2006)

HISTORICAL

How the past affects the present regarding Onchocerciasis in Africa.

- Ninety-nine percent of all river blindness cases are found in Africa.
- In 1974, the Onchocerciasis Control Programme (OCP) was formally launched. It was aimed to stop onchocerciasis from being a public health problem (Akande, 2003)
- Through air-borne spraying of insecticides, it reduced the black fly population drastically along with the use of a drug called invermectin (aka Mectizan) to treat the infected population
- Surgical control of onchocerciasis is difficult to conduct on a large-scale, community level.
- 1st pharmaceutical treatments used were diethylcarbamazine (DEC) and suramin with serious side effects making them unattractive treatment options, especially for wide-scale use at a community level (Gustavsen et al., 201
- African Programme for Onchocerciasis Control 1995
- 500 million invermectin treatments between 1995 and 2010 (Landau, 2013)

POLITICAL

Process by which decisions are made involving the African Government and how the political aspects contribute to Onchocerciasis.

- In the 1970's, economic losses were estimated at US$30 million, and onchocerciasis became a major obstacle to socioeconomic development. This is ultimately what caused governments to try to stop this problem. (World Health Organization. 2016b)
- Since it is not fatal, in poor countries it is often low on the list of health problems.
- AIDS, TB, and cholera are killing people everyday, the governments just cannot justify putting money into fighting a nonfatal disease.

DESIGN

How Onchocerciasis is depicted in art, music, literature, poetry, video, and symbols

- **Issek** a handicaped painter, designed the logo and many of the painting in the house and lab. Issek was the Cameroonian 'painter of the year in 2005' and made exhibitions in Africa, France and USA.
- Right, Valerie, student artist at Issek's training center in Ngaoundéré – financed by the American Ambassy – where others, many of them handicaped like himself, learn to earn their lives by art. (Art and Artists, 2016)

INTERVENTIONS

HEALTH INTERVENTIONS

- The Mectizan Donation Program (MDP) developed by Merck has been providing free treatments to any organization that demonstrates need and the ability to distribute the drugs efficiently since 1985 (USAID's, 2014)
- Mectizan, a versatile drug that was first developed as a veterinary treatment for various roundworm parasites (Silver, 2016)
- Mectizan is currently the only treatment for onchocerciasis.
- All other methods of killing the parasite are toxic to humans (USAID's, 2014)
- A single dose of 150-200 mg/kg 1 time a year can reduce microfilarial density to near zero after one month, and maintain this low level for 12 months (Mectizan, 2016)
- This treatment is required for 10-15 years to ensure all adults and microfilariae are dead (USAID's, 2014).

WHO ORGANIZATIONS

- The African Programme for Onchocerciasis Control (APOC) is the only one currently acting in sub-Saharan Africa
- Helen Keller International is an organization working with MDP and African governments to distribute mectizan across Africa (Helen, 2014)
- The Carter Center works with national ministries of health in both Latin American and Africa to help eliminate onchocerciasis through distribution of mectizan (Carter, 2016)
- Onchocerciasis Control Programme (OCP) using insecticides distributed by airplanes and helicopters from 1974-2002

INNOVATIONS

- ***Mosquito Nets*** and ***insect repellent*** play a large role in preventing the spread of River Blindness
- Mass distribution of ***Ivermectin***, donated by Merck & Co., Inc., to all people living in many areas where O. volvulus is found is being given to control onchocerciasis (WHO, 2016a)
- Between 1974 and 2002 Onchocerciasis Control Programme (OCP), using mainly the spray of ***insecticides*** against blackfly larvae (vector control) by helicopters and airplanes
- African Programme for Onchocerciasis Control (APOC) began in 1995, focusing on community-directed mass drug administration (MDA) of ivermectin in 19 countries (WHO, 2016a)
- While there currently is not a vaccine for river blindness, The Onchocerciasis Vaccine for Africa (TOVA) Initiative has hopes of having a vaccine in phase-two of trials by 2020. (Hotez et al. 2015)

WOW FACTOR

ARTIST'S STATEMENT

The WOW factor was influenced by those survivors of Onchocerciasis who create art, as well as those who make art about the disease.

Instead of immitating the style of Issek (more information about Issek under our design page), I decided to create a series of modern abstract pieces based off of the emotional aspects of the disease and how the physical parasite can invade the carrier, regardless of background, in the correct conditions.

Brightly saturated colors were used to build the foundation of the pieces, as a tribute to color palatte used by Issek in his designs. The disease is represented by strong geometric shapes, placed over the delicate watercolor foundation, as to inturrupt what has been built (I.E. a community, a family, a structure, etc). The "parasite" was drawn and added by hand randomly, to further mimic the irradic, irreversable and overal damaging results of the disease. By visually combining the foundation and the "parasite" together, there is a tension that represents the survivors, still the same person underneath, yet forever changed by the intrusion of the disease on the outside.

I want the viewer to ask themselves, "has the "parasite" ruined the painting? Or rather, has is helped me understand the permenance of the problem?"

Amanda Gallo

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