

Kate Aultman's visit – Project discussions October 9-12, 2010

Participants: Kate Aultman, Asrat Hailu, Alon Warburg, Charles Jaffe, Roy Faiman, Adi Moncaz, Amit Huppert, Ezer Miller, Moshe Shenker

Itinerary:

Sunday October 10: All day meeting at the HUJI Faculty of Medicine

Intensive discussions aimed at focusing the project goals and, hence, work plan regarding:

1. *Drivers of Transmission* – Specifically what is/are the most significant sources of *Leishmania donovani* infections in sand flies?
2. Temporal and spatial aspects of Human-Sand fly contact. When (season, time of day) and where (field, forest, home, camp) do sand flies bite people.

Asrat Provided a plan of action for the cohort studies on village populations in Sheraro and migrant laborer populations in and around Humera. In Sheraro the plan will be to cover all the population within the affected villages estimated at 3,500-5,000 inhabitants and repeat the sampling three times a year. Initial sampling will take place during January 2010. As much data as possible will be derived including questionnaires informing on socio-economic parameters, locality of residence, family, general health, clinical diagnosis, serodiagnosis, PCR diagnosis, exposure to sand fly bites (saliva) by ELISA. In repeat sampling will from the same population will focus mainly on clinical diagnosis and sero-conversion.

Ezer & Amit presented their outline for a mathematical model which will be formulated based upon and limited by the quality of the data that can be derived from the field studies (mainly cohorts, entomological, xenodiagnostic)

Charle summarized initial progress made by his group on molecular characterization of *Leishmania donovani* strains from different parts of Ethiopia with reference to strains from India.

Adi & Alon gave an overview of their progress in developing different types of emergence traps for monitoring potential sand fly breeding habitats. Thus far emerging *Phlebotomus orientalis* were only found in Addis Zemen. These were collected emerging from cracks in the soil on the banks of a dry river bed.

Kate explained the Gates Foundation's rationale for funding scientific projects. She reemphasized the crucial importance of identifying the drivers of transmission. The project should focus on these studies that will directly contribute to attaining this goal and on modeling efforts that will guide us in putative interventions at later stages.

Alon summarized the approaches in the diagram (following page)

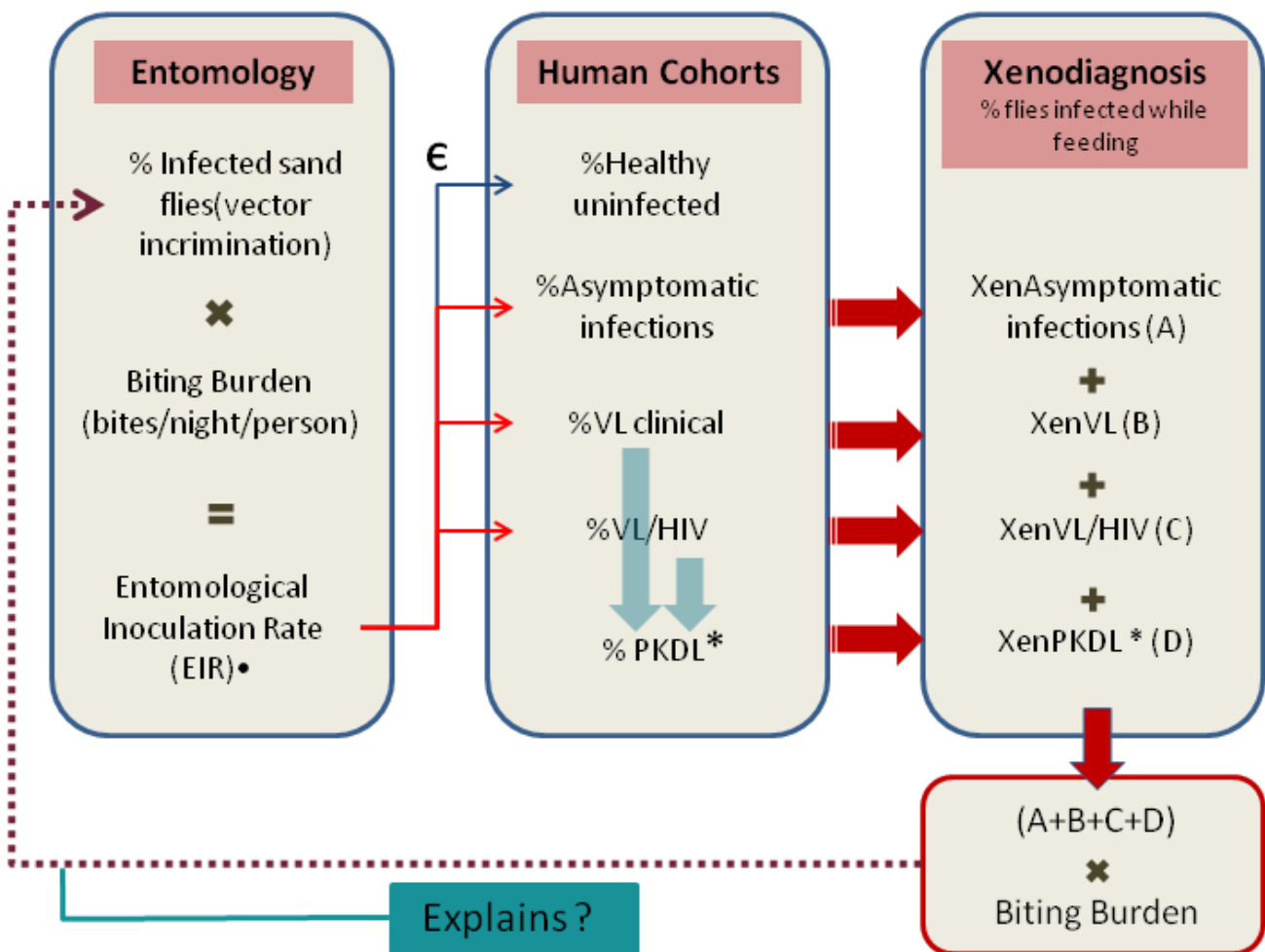


Attendees of the meeting on October 10, 2010. From left to right: Charle, Alon, Oscar, Yitav, Asrat, Abed, Moshe, 50% Adi, Amit, Kate, and Charle

On October 11th, some more discussions were conducted and in the evening a social get together at Alon's home – documented in the photos below.

Schematic representation of the activities required to identify the crucial driver(s) of transmission & determine the vectorial capacity of the vector(s) in Ethiopian Kala Azar foci

Driver of Transmission = A significant source of parasites for infecting vectors



- EIR will be determined for entire year(s) in order to include and average-out high levels of transmission during the dry season with rainy seasons when there is no transmission or very little.

€ Exposure to sand fly bites will be estimated by determining the levels of α -saliva Abs.

* I suspect that PKDL is only one manifestation of parasites' presence in the skin – the most obvious clinical one. VL cases treated with SSG that do not develop PKDL may still harbor parasites in the skin, and could be infectious to flies. This may be especially important in the case of HIV infected individuals.

If:

([A%Asymptomatic] + [B%VL] + [C%VL/HIV] + [D%PKDL]) X (Human Biting Burden) adequately explains the *Leishmania donovani* infection rates in Sand flies

And:

The rate of conversion of non-infected to infected [Asymp or clinical] humans is adequately explained by bites of infected flies

Then:

The disease is anthroponotic and there is no need to postulate the existence of zoonotic reservoirs. The relative contribution of each subpopulation needs to be determined by taking into consideration their relative abundance (% of total population) and multiplying it by their infectiousness constants (i.e. A,B,C,D).

If not:

A similar study needs to be performed on potential animal reservoir hosts to determine their relative contribution to the infection of sand fly vectors**.

** We plan to perform small-scale studies on reservoir hosts in parallel with the rest of the efforts. Human cohort and vector incrimination studies will comprise about 75% of the effort. Related entomological studies (larval habitats, α -saliva antibodies) will account for 15%, while zoonotic reservoir studies will comprise the remaining 10% of the effort.

*** Spatial relations between putative drivers of transmission and susceptible populations will be taken into account by mapping their respective locations in relation to sand fly vectors during the relevant transmission periods.



It took a little time for the food to arrive so Amit whiled away the time showing off Baboon photos from the Simien mountains : Amit, Charle, Irene and Asrat - the table seconds before the raid



Gunter posed for the camera while the rest busied themselves with the nourishment. Ezer came late but made up for it with a few platefuls.

Towards the end of the evening Alon started pondering the dishes awaiting, while Oscar reflected upon the next morning's awakening – 4:30 AM to the field for collecting his traps.

