中華白蛉之黑熱病鞭毛體天然感染

孫志戎 姚永政 祝海如 吳徵鑑

民國二十六年二月

中華醫學雜誌第二十三卷
第二期第144面至第151面

中華白蛉之黑熱病鞭毛體天然感染*

NATURAL INFECTION OF PHLEBOTOMUS CHINENSIS WITH FLAGELLATES MORPHOLOGICALLY INDISTINGUISHABLE FROM THOSE OF LEISHMANIA DONOVANI

全國經濟委員會衛生實驗處寄生蟲學系黑熱病研究隊

孫志戎 姚永政 祝海如 吳徵鑑

Sinton 氏 1922 首創印度黑熱病（Kala-azar）流行區域與銀足白蛉（*Phlebotomus argentipes*）之地理分佈互相吻合，故於該病傳染途徑之探討，似有顯著之線索可尋；厥後，專家繼起，1934 Knowles, Napier 及 Smith 三氏用銀足白蛉吸取黑熱病病人血液，經三日至五日之飼養，能於白蛉胃中發現黑熱病鞭毛體之人工感染；1926 Shortt, Barraud 及 Craighead 三氏復於印度亞山省（Assam, India）之黑熱病病人家中尋得銀足白蛉之黑熱病鞭毛體天然感染；最近，更經 Shortt, Smith, Krishnan 及 Swaminath 諸氏 (1931)，及 Napier, Smith 及 Krishnan 三氏 (1933) 先後以已感染黑熱病鞭毛體之銀足白蛉經吸血法使黑熱病病原傳入中華田鼠 (Chinese hamsters) 之實驗皆臻成功；於是舉世學者多以白蛉爲傳染黑熱病最可疑之媒介.

考我國黑熱病流行長江以北諸省，蔓延至廣，該區域中均有白蛉生存. 同人等爲欲明瞭白蛉傳染黑熱病之理論，在我國是否適應，故特先將流行區域中白蛉之黑熱病鞭毛體天然感染問題試加探討，現將所得結果，綜述於斯，至所發現黑熱病鞭毛體對

*本文曾於民國二十四年十一月在廣州舉行之中華醫學會第三屆大會中宣讀

於動物之傳染試驗,及此種鞭毛體之形態學,俟日後再行發表,尙希海內外賢碩名儒,幸垂教之.

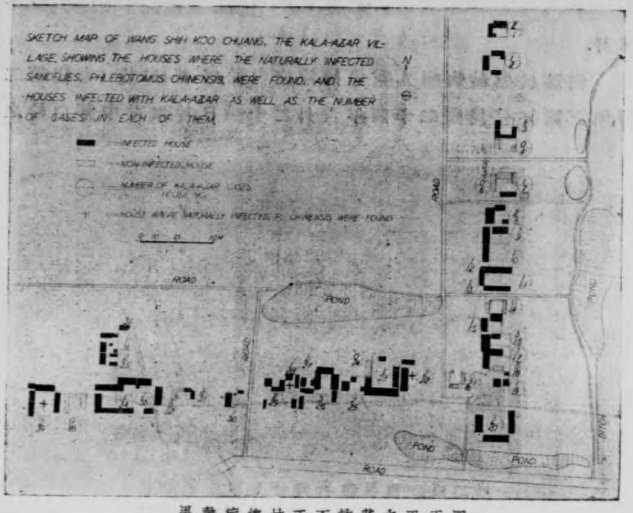
縱觀我國黑熱病之過去研究工作,據 Young 及 Hertig 1925 之研究結果,在黑熱病流行區域之徐州所捕集之白蛉中,有司氏白蛉 (*Phlebotomus sergenti*) 993 隻,及中華白蛉 (*Phlebotomus chinensis*) 72 隻,用直接塗片,或動物接種,或幷用二法試驗,皆未能於塗片中尋得黑熱病鞭毛體,動物接種亦無感染. 嗣後,1926 復於北京檢驗中華白蛉及司氏白蛉共 200 隻,仍無鞭毛體之發現. Patton 及 Hindle 1926 曾在山東濟南研究,據其文獻中所述,幷未提及該處所捕白蛉之解剖結果. 直至民國二十四年六月二十一日,始經同人等於江蘇清江浦王石鼓莊之黑熱病病人家中,首次尋得中華白蛉之黑熱病鞭毛體天然感染.

黑熱病鄉村之狀況

王石鼓莊居江蘇清江浦黑熱病研究隊以北三十六華里. 清江浦爲蘇北重鎭,居運河兩岸,亦黑熱病流行最癘之區域也. 按王石鼓莊有居戶 39 家,居民 237 人 (參觀第一圖). 經民國

第一圖　黑熱病鄉村王石鼓莊之村景

二十四年六月六日在該莊調查,共有黑熱病病人46人,占百分之19.41. 感染黑熱病之住戶有30戶,占百分之76.92(參觀地圖).



黑熱病蔣村王石鼓莊之平面圖

■ = 已感染黑熱病住戶

□ = 未感染黑熱病住戶

$\ominus = \frac{\text{感染黑熱病人數}}{\text{住戶門號}}$

十 = 該戶中捕得天然感染黑熱病雌毛體之中華白蛉

曾於過去三年中,死去黑熱病病人三名,按此次黑熱病流行該村僅數年耳.

中華白蛉解剖之結果

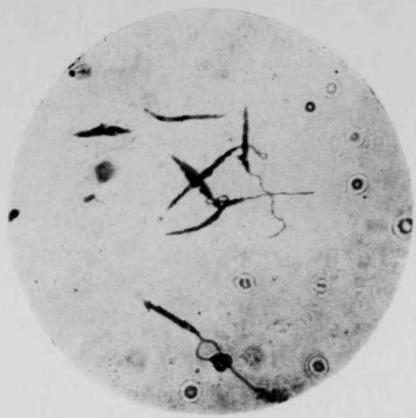
自民國二十四年六月六日至七月十六日間,約每四日往該村捕集白蛉一次,共調查九次,總計尋獲白蛉769隻,雌者占684隻,

雄者占85隻. 其中中華白蛉（*Phlebotomus chinensis*）爲數最多,司氏白蛉（*Phlebotomus sergenti* var. mongolensis）次之,鱗喙白蛉（*Phlebotomus squamirostris*）又次之,更有新種白蛉一種,其形態學之研究另詳.

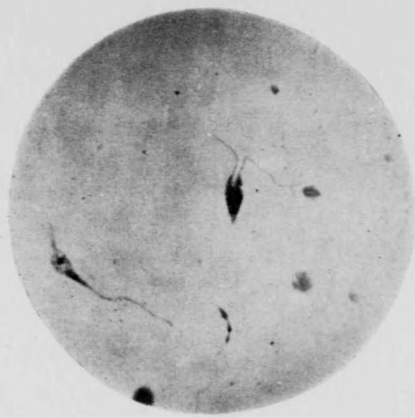
從該村黑熱病病人家中捕獲之白蛉,雌者421隻（參觀第二圖,第三圖）. 民國二十四年六月二十一日,首次在中華白蛉之

第二圖　在黑熱病鄉村王石鼓莊尋得中華白蛉含有黑熱病簇毛體天然感染之二十二戶外觀

第三圖　二十二戶臥室之內觀



第四圖　由王石鼓莊捕集之中華白蛉胃塗片中所發現之黑熱病鞭毛體.
其一（放大 1140 倍）



第五圖　由王石鼓莊捕集之中華白蛉胃塗片所發現之黑熱病鞭毛體.
其二（放大 950 倍）

孫志戎　諸家政　祝海如　吳覺鑑

胃中發現天然感染之黑熱病鞭毛體. 其後復相繼發現六例,其鞭毛體亦均在胃中(參觀第四圖,第五圖). 如是, 421 隻中共發現七例,換言之,占百分之 1.66 (參觀第一表). 同時將其中二隻白蛉所含之鞭毛體,分別注於兩隻中華田鼠之腹腔內,經99及240日剖驗,未查見黑熱病小體. 推原其故,或因注射之傳染物已汚染,或因經過時期不久,未足致病,或因自行復原,有以致之也.

第一表 天然感染黑熱病鞭毛體之中華白蛉記錄

號數	捕集日期	解剖日期	捕集及解剖日期相隔之日數	發現天然感白蛉病家之門數	病家之病人數目
1	6月18日	6月21日	3	22	2
2	6月22日	6月25日	3	22	2
3	6月22日	6月25日	3	22	2
4	6月22日	6月26日	4	28	1
5	6月25日	6月27日	2	22	2
6	7月 4日	7月 7日	3	28	1
7	7月16日	7月18日	2	39	2

在解剖 421 隻中華白蛉中,幷發現蛋形體 (O-shaped bodies) 26例,占百分之 6.18. 此項白蛉多由已尋得黑熱病鞭毛體天然感染之黑熱病病人家中捕集,此外五例亦在黑熱病病人家中捕集. 此種蛋形體之性質,曾函詢 Smith 氏,據復彼在印度曾於白蛉咽部亦發現蛋形體,而認爲該項蛋形體,即係黑熱病小體,幷非三N氏培養基內所謂壞變後之黑熱病鞭毛體云云 (參觀第二表).

第二表 黑熱病病人家中感染蛋形體之中華白蛉

病家號數	含有蛋形體之中華白蛉數目
11	1
22	9
28	2
33	4
39	10
總數	26

黑熱病鞭毛體之形態

中華白蛉天然感染之黑熱病鞭毛體，與試驗室中自病之中華白蛉人工感染所尋得之黑熱病鞭毛體，形態相同.*　其形態學之研究，另文發表.

撮　要

民國二十四年六月至七月十六日，共在江蘇清江浦黑熱病鄉村王石鼓莊之病人家中尋得白蛉 769 隻，中華白蛉 421 隻，經解剖後，胃中發現含有天然感染之黑熱病鞭毛體者共七例.　黑熱病病人家中之中華白蛉胃中，亦發現蛋形體 26 例.

我國中華白蛉均經先後尋得天然感染及人工感染之黑熱病鞭毛體，與印度銀足白蛉研究所得之結果相同.　根據我國長江以北黑熱病流行區域與中華白蛉地理上之分佈一致，及此次尋得中華白蛉之天然感染與人工感染種種事實，故此種白蛉即為傳染我國黑熱病之媒介，殊可信也.

* 在未幸獲中華白蛉黑熱病鞭毛體天然感染以前，曾用自病中華白蛉 178 隻，個吸黑熱病病人血液，其中五例已於胃中發現黑熱病鞭毛體之人工感染，并於五例中之一例，黑熱病鞭毛體已進展於前胃中.　中華白蛉及其他白蛉人工感染之結果另文發表.

文　獻

Christophers, S. R., Shortt, H. E., and Barraud, P. J.: The development of the parasite of Indian kala-azar in the sandfly Phlebotomus argentipes Annandale and Brunetti. Ind. Jour. Med. Res., 12: 605-607, 1925.

Christophers, S. R., Shortt, H. E., and Barraud, P. J.: Further observations

on the feeding of sandflies, Phlebotomus argentipes, on cases of Indian kala-azar. Ind. Jour. Med. Res., 13: 159-165, 1925.

Christophers, S. R., Shortt, H. E., and Barraud, P. J.: Development of the parasite of Indian kala-azar in the sandfly Phlebotomus argentipes: controls. Ind. Med. Res. Mem., No. 4,135-139, 1926.

Christophers, S. R., Shortt, H. E., and Barraud, P. J.: Development of the parasite of Indian kala-azar in the sandfly Phlebotomus argentipes: re-fed flies and further results of the feeding of sandflies on kala-azar cases. Ind. Med. Res. Mem., No. 4, 141-145, 1926.

Knowles, R., Napier, L. E., and Smith, R. O. A.: On a herpetomonas found in the gut of the sandfly Phlebotomus argentipes, fed on kala-azar patients. Ind. Med. Gaz., 59: 593-597, 1924.

Napier, L. E., and Smith, R. O. A.: Further observations on the feedings of sandflies, Phlebotomus argentipes on cases of kala-azar in Calcutta. Ind. Med. Res. Mem., No. 4, 147-153, 1926.

Napier, L. E.: An epidemiological consideration of the transmission of kala-azar in India. Ind. Med. Res. Mem., No. 4, 219-265, 1926.

Napier, L. E., Smith, R. O. A., and Krishnan, K. V.: The transmission of kala-azar to hamsters by the bite of the sandfly Phlebotomus argentipes. Ind. Jour. Med. Res., 21: 299-304, 1933.

Napier, L. E.: The transmission of kala-azar in India. Trans. 9th. Congress, Far East. Assoc. Trop. Mel., 1: 657-666, 1934.

Patton, W. S., and Hindle, E.: The development of Chinese Leishmania in Phlebotomus major var. chinensis and P. sergenti var. Proc. Roy. Soc., Ser. B, 101: 369-390, 1927.

Patton, W. S., and Hindle, E.: The North Chinese species of the genus Phlebotomus (Diptera, Psychodidae). Proc. Roy. Soc., Ser. B, 102: 533-551, 1928.

Shortt, H. E., Barraud, P. J., and Craighead, A. C.: The occurrence in nature of Phlebotomus argentipes infected with a flagellate morphologically identical with Herpetomonas donovani. Ind. Jour. Med. Res., 14: 521, 1926.

Shortt, H. E., Barraud, P. J., and Craighead, A. C.: The life history and morphology of Herpetomonas donovani in the sandfly Phlebotomus argentipes. Ind. Jour. Med. Res., 13: 947-959, 1926.

Shortt, H. E., Craighead, A. C., Smith, R. O. A., and Swaminath, C. S.: Phle-

botomus argentipes caught in nature infected with Leishmania donovani. Ind. Jour. Med. Res., 17: 913-914, 1930.

Shortt, H. E., Smith, R. O. A., Swaminath, C. S., and Krishnan, K. V.: Transmission of Indian Kala-azar by the bite of Phlebotomus argentipes. Ind. Jour. Med. Res., 18: 1373-1375, 1931.

Sinton, J. A.: Notes on some Indian species of the genus Phlebotomus. Part VIII. Record of the geographical distribution and seasonal prevalence of the known Indian and Cingalese species of the genus Phlebotomus. Ind. Jour. Med. Res., 11: 1035-1049, 1924.

Sinton, J. A.: The role of insects of the genus Phlebotomus as carriers of disease, with special reference to India. Ind. Jour. Med. Res., 12: 701-729, 1925.

Sinton, J. A.: The identification and classification of the species of the genus Phlebotomus, with some remarks on their geographical distribution in relation to disease. Trans. 7th. Congress, Far East. Assoc. Trop. Med., 3: 172-189, 1927.

Sinton, J. A.: The synonymy of Asiatic species of Phlebotomus, Ind. Jour. Med. Res., 16: 297-324, 1928.

Sinton, J. A.: Notes on some Indian species of the genus Phlebotomus. Part XXX. Diagnostic table for the females of the species recorded from India. Ind. Jour. Med. Res., 20: 55-74, 1932.

Sinton, J. A.: Notes on some Indian species of the genus Phlebotomus. Part XXXVI. Diagnostic table for the males of the species recorded from India. Ind. Jour. Med. Res., 21: 417-428, 1933.

Young, C. W.: Kala-azar in China. China M. J., 37: 797-822, 1923.

Young, C. W., and Hertig, M.: The development of flagellates in Chinese sandflies (Phlebotomus) fed on hamsters infected with Leishmania donovani. Proc. Soc. Exp. Biol. and Med., 23: 611-615, 1926.

Young, C. W., and Hertig, M.: Kala-azar transmission experiments with Chinese sandflies (Phlebotomus). Proc. Soc. Exp. Biol. and Med., 24: 823-825, 1927.

Young, C. W., and Hertig, M.: The kala-azar transmission problem: field and laboratory studies in China. II. Susceptibility of various rodents to infection with Leishmania donovani. Amer. Jour. Hyg., 10: 183-200, 1929.

National Medical Journal of China, 1937, Vol. XXIII No. 2. 144—151

NATURAL INFECTION OF PHLEBOTOMUS CHINENSIS WITH FLAGELLATES MORPHOLOGICALLY INDISTINGUISHABLE FROM THOSE OF LEISHMANIA DONOVANI

C. JUNG SUN, Y. T. YAO, H. J. CHU AND C. C. WU

Kala-azar Research Station, Department of Parasitology, Central Field Health Station, Nanking, China.

(Summary and Conclusion)

A total number of 769 sandflies were collected from the houses of kala-azar patients in Wang Shih Koo Chuang (王石鼓莊), Tsing-kiang-pu (清江浦), North Kiangsu, between June 6th and July 16th 1935. Among them 421 female *Phlebotomus chinensis* were dissected with the finding in the midguts of seven flies of flagellates which are morphologically indistinguishable from those of *Leishmania donovani.* O-shaped bodies were found in the guts of 26 *Phlebotomus chinensis* captured in the kala-azar infected houses.

Phlebotomus chinensis has now been found by us to be both naturally and artificially infected with flagellates of *Leishmania donovani,* just as *Phlebotomus argentipes* has been so found by workers in India. In view of the fact that *Phlebotomus chinensis* is widely distributed in the kala-azar districts in North China, as noted by Patton and Hindle, and of our present finding of its natural and artificial infection with flagellates of *Leishmania donovani,* we have good reasons to believe that this species of sandfly is the vector of kala-azar in China.