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SENSITIVITY OF TRYPANOSOMA EVANSI TO HUMAN BLOOD

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT FOR THE DEGREE OF MASTER IN PARASITOLOGY AND MEDICAL ENTOMOLOGY

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Abstract

The study aimed to investigate the effect of human blood, serum and plasma on *T. evansi* which is a parasites of camels. The parasite was isolated from naturally infected camel. Human blood, serum and plasma was obtained from Khartoum Blood Bank. Twenty rats were divided into 5 groups (A-B-C-D and E). 0.2ML of blood contains *T. evansi* was mixed and incubated for 10 minutes with 0.2ml of blood, serum, plasma, camel serum & normal saline. Each alone was inoculated into rat.

A second experiment in which 0.2ml *T. evansi* was mixed with 0.4ml plasma was conducted. The result showed that the rats inoculated with parasites incubated in camel serum, human plasma & normal saline development parasitaemia whole those incubate in human blood & serum failed to induce parasitaemia. These allow the conclusion that the human blood & serum contain factors that is lethal to the parasites & that such factor may not be available in the human plasma.
الملخص

الدراسة هدفت إلى معرفة امكانيه تأثير دم وسيرم وبلازما الإنسان على طفيل التربانسوما افانيسي والتي تسبب الامل في عزل الطفيلي من الامل المصابة طبيعيا ثم احضار دم سيرم بلازما من بنك الدم الخرطومي وكذلك تم احضار عشرون فار قسمت الام الخمسة مجموعات كل مجموعة تحتوي علي اربعة فنرات ( مجموعة A، B، C، D) تم خلط 2 مل تحتوي علي مليون طفيلي مع دم انسان سيرم انسان - بلازما انسان - سيرم الامل - محلول ملح الطعام وتم حضانة الطفيلي لفترة عشرة دقائق حقن بعدها في كل فار كل مجموعة على التوالي اجريت تجربة ثانية في البلازما ووضعت النتائج أن الطفيلي قد تكونت وظهر في دم الفنرات التي حقنها سيرم الامل ومحول ملح الطعام وأيضا البلازما ولم يظهر للنتي حقنها دم وسيرم الإنسان وكذلك ظهر الطفلي عند مضاعفه جرعه البلازما ومن ذلك يتضح أن هناك عامل يمنع نمو الطفيلي في الفنرات عند خلطه بدم الإنسان والسيرم وان نموه مع البلازما يعني أن هذا غير موجود في البلازما ولذلك سمح للطفيلي بالنمو.
INTRODUCTION

*Trypanosoma evansi* is a haemoprotozoa flagellates that belong to the phylum Sarcomastagophra.

The parasite causes a wide spread diseases of camels, horses, elephants, deer, and many other mammals. The disease goes by many different names in different languages and countries ie Surra in India and Guffar in Sudan.

*T. evansi* is principally a parasite of camels in Sudan. The parasite is distributed throughout the northern half of Africa, Asia minor southern Russia, India, South western Asia, Indonesia Philippines and central and south America. In endemic areas, *T. evansi* is mechanically transmitted *Stamexys, Lyponosia* and *Haemetopota spp.* are incriminated in the transmission of the parasite. In south America vampire rats are common hosts of the disease which is known there as Marina. The disease is most severe in horses, elephants and dogs, with nearly 100% fatalities in untreated cases. It is less pathogenic to cattle and buffalo which may be a symptomatic for months. In camels trypanosomiasis is serious but tends to remain chronic.
While *T. gambiens* and *T. rhodensiense* affect man causing human sleeping sickness, *T. brucei* is an animal parasite which does not infect man. The three parasites *T. gambiens*, *T. rhodensiense* and *T. brucei* belong to the brucei group and they are morphological similar.

Due to the similarity between the parasite microscopic examination is not enough to distinguish the species. In 1970 an attempt to distinguish them was made by Richman and Robson in human blood inoculating them into mice. blood. The test was called blood incubation infectivity test (BIIT) involve incubation of *T. gambiens*, *T. rhodensiense* and *T. brucei* While the former two were infective to mice the latter (*T. brucei*) was not. Since *T. evansi*, is believed to have evolved from *T. brucei* therefore application of this test may show whether the parasite acts as its original form (*T. brucei*) or otherwise.

**Objective:**

To investigate the sensitivity of *T. evansi* to human blood, serum and plasma.
RESULTS

The results showed that while no parasitemia was observed in rats inoculated with *T. evens* incubated into human serum and human blood, the rats which received *T. evens* incubated into camel serum (Group A), human plasma (Group B) and normal saline (Group E) developed progressive parasitaemia, inday 4, 6, 10 and 13 post-infection the parasitemia was 6.9, 7.2, 7.5 and 8.0 in group A, 6.9, 7.3, 7.8, and 7.8 in group B and 7.9, 8.2, 8.3, and 8.8 in group E.

In the second experimental the rats which received *T. evansi* incubated in twice the volume of human plasma developed parasitemia which was 6.9 and 8.0 as at D1 and D3 respectively, control (Group B) showed 6.4 and 7.2 at D1 and D3 respectively (Table 2, Fig2)
DISCUSSION

The result obtained showed that parasitemia developed in rats inoculated with *T. evansi* incubated normal saline and camel serum and . This is obvious as normal saline is merely a diluent. Similarly the camel serum supported of the parasite as the camel is principale host for this particular parasite .

Failure of rats inoculated with *T. evansi* incubated in human blood and serum to develops parasitemia indicate that there is factor in the blood and serum which is lethal to the parasite. The affect of human blood and serum on animal *trypasnsomes* was first detected by Rickman and Rabson(1970) when they showed that using the blood incubation infectivity test (BIIT). That while *T. rhodensies* and *T. Gambiens* was not effected, *T. brucei* was affected and therefore did not initiate infection in mices Smith and Hajdur(1955). attributed to high density lipoproteins (HDLs) called the *trypansoma* lytic factor(ILF).
Rats received T.evansi incubated in human plasma developed parasitemia even when the amount of plasma was doubled in contrast, Awan (1971) showed that T.brucæ incubate in human plasma was not effective to mice. It is probable that affect induced by the fact that incubate the parasites five hours while in the present work it was incubate for half an hour only.


3) Gerald D. Schmidt & Larry S. Roberts


