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BRIEF COMMUNICATION

CHARACTERIZATION OF A *TRYPANOSOMA CRUZI* STRAIN ISOLATED FROM A NON-ENDEMIC AREA IN NORTHEAST BRAZIL

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Chagas' disease presents a variety of epidemiological and clinical pictures in Latin America. In Brazil, the socioeconomic impact of the disease during the chronic stage is high. According to WHO [10] about 30% of the infected population (75,000 people) will develop severe cardiac and digestive lesions such as cardiac arrhythmia (45,000 cases) and megaesophagous and megacolon (30,000 cases) every year, thus presenting a serious public health problem.

Differences detected in the clinical presentation of Chagas' disease in different endemic areas, as well as the enormous variability in response of different *T. cruzi* strains to chemotherapeutic drugs, have led to the hypothesis that parasite strains can be a factor accounting for such discrepancies [2]. The adoption of standard methods for strain classification as well as the need for analytical epidemiological studies to determine associations between *T. cruzi* strains and clinical and geographical varieties of Chagas' disease, was agreeded in an international meeting held in Panama City [9].

In Brazil, the classification of *T. cruzi* and their correlation with the clinical manifestations of the chagasic infection have been more detailed in the Reconcavo Baiano-Bahia State [1-4]. In others areas of Northeast Brazil the incidence of domiciliated and infected vectors has been determined [5,6]. However, the strains isolated in these regions were not fully characterized.

This work reports the characterization of a *T. cruzi* WSL (Wild São Lorenço) strain isolated from a naturally infected guinea pig from São Lorenço da Mata, rural area of the State of Pernambuco, in Northeast Brazil. Although this is considered a non-endemic area, some cases of chronic cardiac Chagas' disease have been found (MALTA, personnal communication).

For this sixty Swiss albino mice were inoculated with 1 x 10^5 trypomastigotes of the WSL strain by

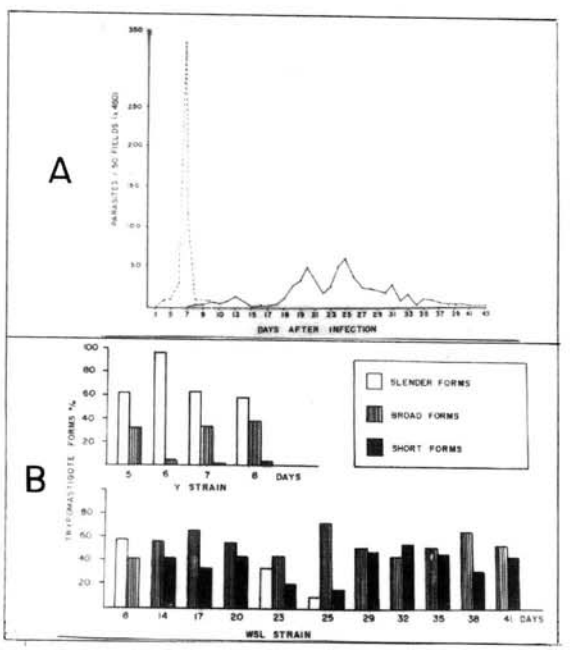

Fig. 1 - Biological behaviour of WSL strain. A - Parasitemia of mice infected with 1 x 10^5 *Trypanosoma cruzi* trypomastigotes. (_____) WSL strain; (.....) Y strain (control). B - Percentage distribution of trypomastigote forms in mice infected with WSL strain. Y strain was used as control.

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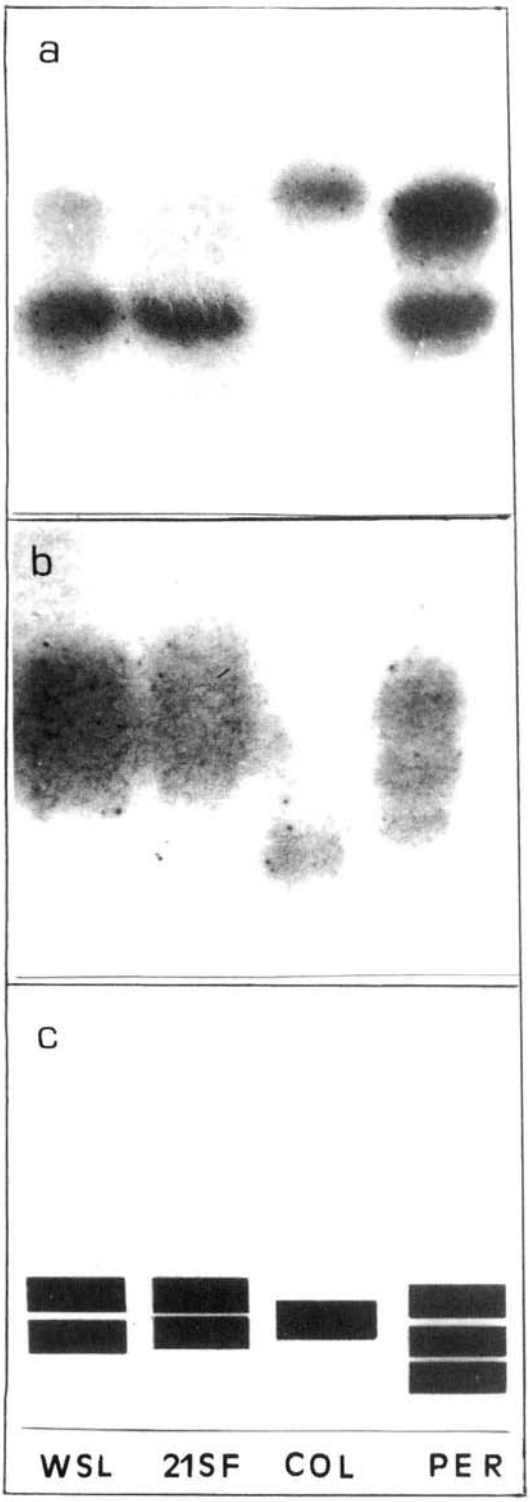

Fig. 2 - Electrophoretic patterns of *Trypanosoma cruzi* strains. The enzymes shown are: a - PGM, b - GPI and c - ALAT. The *T. cruzi* strains are: PER - Peruviana (Tipo I), COL - Colombiana (Tipo III), 21SF - São Felipe and WSL - Wild São Lorenço (Tipo II).

intraperitoneal route. As a control the Type I Y strain was used. The morphobiological behaviour as well as the histophathological study were analyzed according to ANDRADE [1] and BRENER [7]. The isoenzymic study was performed according to ANDRADE [4]. In this approach the following enzymes were investigated: alanine aminotransferase (E.C.2.6.1.2. ALAT), phosphoglucomutase (E.C.2.7.5.1. PGM) and glucosephosphate isomerase (E.C.5.3.1.9. GPI). As a reference control, the prototypes of each of the three morphobiological patterns (Peruviana-Type I; 21SF-Type II and Colombiana-Type III) were included on each electrophoretic running.

The WSL strain presented slow multiplication and parasitemic peaks within 21 and 25 days postinfection (Fig. 1A). Cumulative mortality was 3.3% at the 31-40 days after infection. It was verified a predominance of broad forms of the parasite throughout the course, with the presence of slender forms in the earlier phase (Fig. 1B). Myotropism with predominant cardiac involvement was detected. The WSL strain was classified as Type II by its morphobiological characters. Data obtained for the Y strain shows the already described characteristics of Type I strains (rapid multiplication, predominance of slender forms, macrophagotropism and high virulence). The isoenzymic analysis showed the pattern of zymodeme 2 (Z2) that has been shown to correspond to the biological Type II strains (Fig. 2). Thus, we conclude from the above data that the WSL strain has a very low virulence and pathogenicity. May be this could explain the difficulties in the clinical identification of Chagas' disease in São Lorenço da Mata. One could also especulate that the infection with low virulence and pathogenicity strains may protect against infection with more virulent strains.

The WSL strain was initially referred as W strain [8]. However, to differentiate it from W or WBH strain isolated from a Brazilian patient in 1926 by Reychenov, the designation WSL is now being proposed.

RESUMO

Caracterização de uma cepa de *Trypanosoma cruzi* isolada de uma zona não endêmica no Nordeste do Brasil

A cepa WSL (Wild São Lorenço) de *T. cruzi*, isolada de um cobaio proveniente de São Lorenço da Mata (Nordeste do Brasil) foi caracterizada através da

análise do seu comportamento morfobiológico e perfil isoenzimático. Para o estudo do comportamento morfobiológico, tripomastigotas sanguíneos (1 x 10^5) da cepa WSL foram inoculados por via intraperitonal em camundongos albinos Swiss. Como controle a cepa Y (Tipo I) foi usada. Durante o curso da infecção os seguintes parâmetros foram analisados: parasitemia, mortalidade, morfologia dos parasitas no sangue periférico e tropismo tissular. O perfil isoenzimático foi analisado em relação às enzimas ALAT, GPI e PGM usando como controle de referência as cepas Peruana (Tipo I), 21SF (Tipo II) e Colombiana (Tipo III). A cepa WSL apresentou as seguintes características biológicas: 1) multiplicação lenta e pico parasitêmico entre 21 - 25 dias pós-infecção; 2) mortalidade de 3,3% 40 dias pós-infecção; 3) predominância de formas largas no sangue periférico e 4) miotropismo com predominante envolvimento cardíaco. A análise isoenzimática mostrou um padrão de zimodema 2 (Z2) que corresponde às cepas biológicas Tipo II. Os resultados mostram que a cepa WSL apresenta baixa virulência e patogenicidade.

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REFERENCES

1. ANDRADE, S. G. - Caracterização de cepas isoladas no Recôncavo Baiano (Contribuição ao estudo da patologia geral da doença de Chagas em nosso meio). **Rev. Pat. trop., 3**: 65-121, 1974.

2. ANDRADE, S. G. - Morphological and behavioural characterization of *Trypanosoma cruzi* strains. **Rev. Soc. bras. Med. trop., 18** (suppl.): 39-46, 1985.

3. ANDRADE, S. G.; ANDRADE, V.; ROCHA FILHO, F. D. & BARRAL NETO, M. - Análise antigênica de diferentes cepas do *Trypanosoma cruzi*. **Rev. Inst. Med. trop. S. Paulo, 23**: 245-250, 1981.

4. ANDRADE, V.; BRODSKYN, C. & ANDRADE, S. G. - Correlation between isoenzymic patterns and biological behaviour of different strains of *Trypanosoma cruzi*. **Trans. roy. Soc. trop. Med. Hyg., 77**: 796-799, 1983

5. BENTO, D. N. C.; BRANCO, A. Z. C. L.; FREITAS, M. R. & PINTO, A. S. - Epidemiologic studies of Chagas' disease in the urban zone of Terezina. State of Piauí, Northeastern Brazil. **Rev. Soc. bras. Med. trop., 17**: 199-203, 1984.

6. BENTO, D. N. C.; FREITAS, M. & PINTO, A. S. - Epidemiologia da doença de Chagas nos municípios de Castelo do Piauí e Pedro II, Estado do Piauí, Brasil. **Rev. Soc. bras. Med. trop., 22**: 73-79, 1989.

7. BRENER, Z. & CHIARI, E. - Variações morfológicas observadas em diferentes amostras de *Trypanosoma cruzi*. **Rev. Inst. Med. trop. S. Paulo, 5**: 220-224, 1963.

8. GOMES, Y. M.; ABATH, F. G. C.; MONTENEGRO, S. M. L.; CARVALHO, A. B. & FURTADO, A. F. - Experimental *Trypanosoma cruzi* infection with metacyclic trypomastigotes (W strain) from *P. megistus*: preliminary results. **Mem. Inst. Oswaldo Cruz, 82** (suppl.): 53, 1987.

9. WORLD HEALTH ORGANIZATION - Report of the steering committes. Research Activities of the Scientific Working Group (SWG) on Chagas' Disease. **Mem. Inst. Oswaldo Cruz, 81** (suppl.): 181-244, 1986.

10. WORLD HEALTH ORGANIZATION - Tropical disease progress in research 1989-1990. Tenth Programme Report. Geneva, UNDP/WORLD BANK/WHO Special Programme for Research and Training in Tropical Diseases (TDR), 1990. p. 69-77.

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