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A survey of aminotransferase activities in bloodstream *Trypanosoma brucei brucei*

Short communication

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Both glutamate pyruvate transaminase and oxaloacetate transaminase have been reported in bloodstream *T. b. brucei* (Godfrey and Kilgour, 1973; Steiger et al., 1974). The presence of other aminotransferases in bloodstream *T. b. brucei* has not been investigated. However, there is evidence that bloodstream *T. b. gambiense* possess tyrosine aminotransaminase, phenylalanine aminotransferase and tryptophan aminotransferase (Stibbs and Seed, 1975).

In this study the ability of *T. b. brucei* (EATRO, 1969) lysates to transaminate the twenty amino acids commonly found in proteins was investigated using α -ketoglutarate as the amino group acceptor. The amount of L-glutamate formed was assayed by the method described by Bergmeyer (1974) and used as a measure of the minimal aminotransferase activity.

The parasites were isolated by the method described by Njogu and Kiaira (1982) and 2×10^8 trypanosomes per ml in phosphate-buffered saline containing 57 mM Na_2HPO_4 , 3.36 mM NaH_2PO_4 and 73.7 mM NaCl pH 8.0 were frozen in liquid nitrogen at -196°C for 20 min and thawed at 25°C . The lysate was centrifuged at 10,000 *g* for 10 min at 4°C and the resulting supernatant used for transaminase tests. Neutralized α -ketoglutarate and the L-amino acid were added to the supernatant to a final concentration of 10 mM each and the mixture incubated in test tubes at 25°C for 1 h in a Dubnoff Shaking Metabolic Incubator. Incubations were terminated with 14% (v/v) perchloric acid followed by neutralization with 20% (w/v) K_2HPO_4 .

The results in Table 1 show that the aromatic amino acids were transaminated. The highest transamination activity was found with phenylalanine followed by tyrosine, and finally tryptophan. The branched amino acids, leucine, isoleucine and valine were transaminated at approximately the same rate.

Of the remaining amino acids only alanine, aspartate, glutamine and methionine were significantly transaminated. The transamination of alanine gave the highest activity with 1.444 ± 0.410 μmol glutamate formed per h/mg protein. Parasite lysates transaminated methionine at the same rate as methionine. Nine amino acids, i.e. arginine, asparagine, cysteine, glycine, histidine, lysine, proline, serine and threonine, did not show significant transamination activity.

Our results demonstrate for the first time the transamination of glutamine, leucine, isoleucine, valine and methionine by bloodstream *T. b. brucei* lysates. These transaminations should be further investigated to obtain information on substrate specificity, inhibition, optimal conditions for activity and also the end products of the reactions.

The transamination of methionine in *T. b. brucei* should be further investigated because if the transamination pathway of methionine catabolism is similar to the one in rat liver, poisonous

Table 1. Transamination of amino acids by *Trypanosoma brucei brucei*

	L-amino acid	μmol L-glutamate formed per h/mg protein
Aromatic amino acids	Phenylalanine	1.132 \pm 0.00220 (4)
	Tyrosine	0.789 \pm 0.0137 (4)
	Tryptophan	0.385 \pm 0.0141 (4)
Branched amino acids	Leucine	1.022 \pm 0.0275 (4)
	Isoleucine	1.092 \pm 0.0152 (4)
	Valine	1.132 \pm 0.0130 (4)
Other amino acids	Alanine	1.444 \pm 0.0410 (4)
	Aspartate	0.667 \pm 0.0120 (4)
	Glutamine	0.330 \pm 0.0070 (4)
	Methionine	0.645 \pm 0.0116 (4)

intermediates (Benevenga and Steele, 1979) may be released into the plasma, thus contributing to the pathogenicity of trypanosomes.

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