



# Drug-resistant trypanosome isolate populations in dogs in Enugu North Senatorial Zone, Southeastern Nigeria



<sup>1\*</sup>Obi, C.F., <sup>1</sup>Ezeh, I.O., <sup>1</sup>Okpala, M.I., <sup>2</sup>Onyeabor, A., <sup>1</sup>Ezeokonkwo, R. C.

<sup>1</sup>University of Nigeria, Nsukka, Nigeria. <sup>2</sup>Michael Okpara University of Agriculture, Umudike, Nigeria \*Corresponding Author: [Chukwunonso.obi@unn.edu.ng](mailto:Chukwunonso.obi@unn.edu.ng); +2348063707096.

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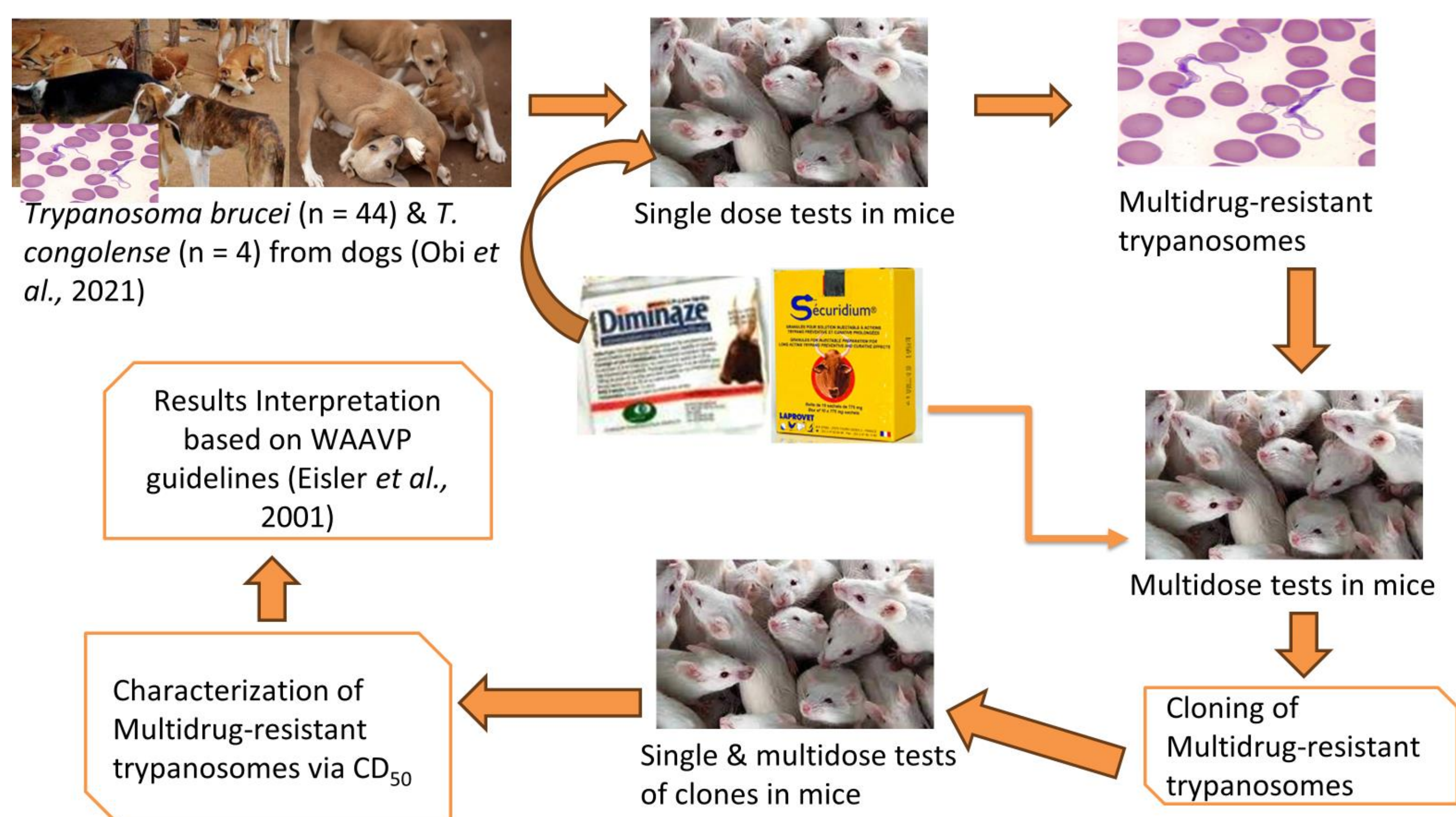
## Background

African animal trypanosomosis is an important endemic protozoan disease, causing morbidities and mortalities in animals in sub-Saharan Africa. Chemotherapy is the widely used method of African animal trypanosomosis control in dogs. Trypanocidal resistance is a serious, under-reported and rapidly emerging problem in Nigeria. A paucity of information exists on the prevalence of drug-resistant trypanosomes in Nigeria.

## Objectives

To determine the sensitivity of *Trypanosoma sp.* isolated from dogs in Enugu North Senatorial Zone (ENSZ), Southeastern Nigeria to trypanocides {diminazene aceturate (DA) and isometamidium chloride (ISM)}.

## Methodology



## Results

Out of the 44 *Trypanosoma brucei* isolates screened, 20 isolates (45.5%) were resistant to trypanocides while all the *T. congolense* isolates were resistant to trypanocides (Table 1). Twelve (50%), four (16.7%) and eight (33.3%) of the drug-resistant trypanosome isolates were resistant to DA, ISM and both trypanocides (multidrug-resistant) respectively.

The clones of the randomly selected multidrug-resistant trypanosome isolate (VTH 22) expressed high levels of resistance to both diminazene aceturate and isometamidium chloride (Table 2) analogous to the original isolate. The CD<sub>50</sub> of VTH 22 Clone 1 and 2 were about 1.3 times higher (P<0.05) than that of the original isolate.

The CD<sub>50</sub> of the drug-resistant trypanosomes ranged between 11 and 34.69 mg/kg. Drug-resistant trypanosomes were characterized into highly resistant [(CD<sub>50</sub> = 11–24.99 mg/kg), (Table 3)] and very highly resistant (CD<sub>50</sub> = >25 mg/kg) trypanosome isolates (Table 4).

Table 1: Sensitivity of *Trypanosoma* Isolates Obtained from Naturally Infected Dogs in ENSZ to trypanocides

	<i>T. brucei</i>	<i>T. congolense</i>	Overall	95% C.I
Sensitive isolates	24 (54.5)	0 (0)	24 (50)	0.352 - 0.648
Resistant isolates	20 (44.5)	4 (100)	24 (50)	0.352 - 0.648
DAR isolates	9 (45)	0 (0)	12 (50)	0.314 - 0.686
ISMR isolates	3 (15)	1 (25)	4 (16.7)	0.061 - 0.365
MDR isolates	8 (40)	3 (75)	8 (33.3)	0.178 - 0.534

DAR – Diminazene Aceturate Resistant; ISMR – Isometamidium Resistant; MDR – Multidrug Resistant

Table 2: The diminazene aceturate resistance profile of VTH 22 and some of its clones following multi-dose test

Isolates	No of mice relapsed					CD <sub>50</sub> (mg/kg)	
	1mg/kg	3mg/kg	10mg/kg	20mg/kg	40mg/kg	CD <sub>50</sub>	95% CI
VTH 22	6	6	5	4	3	27.92	19.87 – 69.13
VTH 22 Clone 1	6	6	4	5	3	35.19	22.10 - 161.94
VTH 22 Clone 2	6	6	6	4	4	37.19	22.34 - 704.22

Table 3: Some Highly Resistant *Trypanosoma* isolates in ENSZ

Isolates	No of mice relapsed					CD <sub>50</sub> (mg/kg)	
	1mg/kg	3mg/kg	10mg/kg	20mg/kg	40mg/kg	CD <sub>50</sub>	95% CI
Orba 10	6	6	5	3	1	20.52	14.7 - 29
Orba 19	6	6	5	2	1	19.06	13.25 – 26.46
Iba 8	6	6	4	3	2	21.72	14.8 - 45
Iba 4	6	6	4	3	2	21.72	14.8 - 36.78
VTH 5	6	5	4	3	2	21.04	12.89 - 45.30
Orba 4	6	6	5	3	2	22.85	16.36 – 36.02

Table 4: Very Highly Resistant *Trypanosoma* isolates in ENSZ

Isolates	No of mice relapsed					CD <sub>50</sub> (mg/kg)	
	1mg/kg	3mg/kg	10mg/kg	20mg/kg	40mg/kg	CD <sub>50</sub>	95% CI
Orba 9	6	6	6	5	2	34.19	25.04 – 54.22
VTH 11	6	5	3	4	3	34.69	26.31 – 60.1
VTH 22	6	6	5	4	3	27.92	19.87 - 69.13
Iba 1	6	6	6	4	2	25.5	19.12 - 39.06

## Conclusion

Drug-resistant trypanosomes are prevalent in dogs in ENSZ with CD<sub>50</sub> ranging between 11 and 34.69 mg/kg. Multidrug-resistant trypanosomes were detected with clones recording high levels of resistance to both DA and ISM.



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