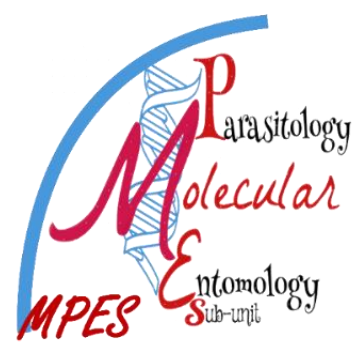




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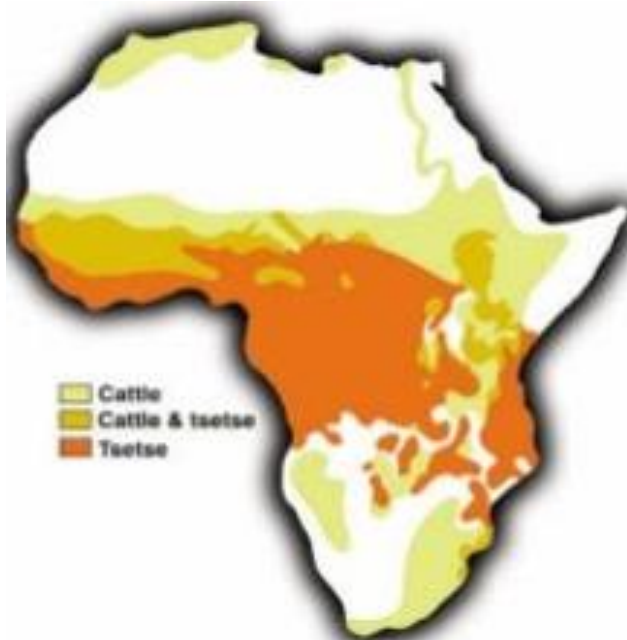


37TH GENERAL CONFERENCE OF THE INTERNATIONAL SCIENTIFIC COUNCIL FOR TRYPANOSOMIASIS RESEARCH AND CONTROL (ISCTRC)

Genetic diversity of trypanosomes circulating in the blood and skin of domestic and wild animals of Campo and Bipindi sleeping sickness foci of the forest region of southern Cameroon

Melaine Eugenie Magang Kemta, Rolin Mitterran Kamga Ndefo, Patricia Sabine Kouam Nouton, Goethe Gatien Tchuisseu Younkam, Jenny Telleria, Vincent Jamonneau, Brice Rotureau, Jean-Mathieu Bart, Gustave Simo

Animal African Trypanosomiasis



- About 32 of the poorest African countries are infested by tsetse flies or mechanical vectors

Impact of AAT

- 150 million cattle and 260 million sheep and goats are infected with trypanosomes (Kennedy *et al.*, 2019)
- The annual economic losses resulting from AAT have been estimated to be around \$1,300 million (Reis *et al.*, 2019)
- Constraint for livestock and agriculture development in African regions presenting the greatest productivity potential (Diall *et al.*, 2017)

Introduction 2/5

- AAT constitutes a serious threat for the achievement of some Sustainable Development Goals (SDGs) like “no poverty (SDG 1)”, “zero hunger (SDG 2)”, and “Good health and well-being (SDG 3)”.



- *T. brucei* s.l
- *T. congolense* forest
- *T. congolense* savannah
- *T. vivax*





The skin is a significant but overlooked anatomical reservoir for vector-borne African trypanosomes

Paul Capewell^{1,2,3†}, Christelle Cren-Travaillé^{4,5†}, Francesco Marchesi⁶, Pamela Johnston⁶, Caroline Clucas^{1,2,3}, Robert A Benson^{2,7,8}, Taylor-Anne Gorman^{1,2,3,7,8}, Estefania Calvo-Alvarez^{4,5}, Aline Crouzols^{4,5}, Grégory Jouvion⁹, Vincent Jamonneau¹⁰, William Weir^{1,2,3}, M Lynn Stevenson⁶, Kerry O'Neill^{1,2,3}, Anneli Cooper^{1,2,3}, Nono-raymond Kuispond Swar¹¹, Bruno Bucheton¹⁰, Dieudonné Mumba Ngoyi¹², Paul Garside^{2,7,8}, Brice Rotureau^{4,5†}, Annette MacLeod^{1,2,3*‡}

Amisigo et al. *Parasites & Vectors* (2024) 17:215
<https://doi.org/10.1186/s13071-024-06277-7>

Parasites & Vectors

BRIEF REPORT

Open Access

Adipose and skin distribution of African trypanosomes in natural animal infections

Cynthia Mmalebna Amisigo^{1,2}, Gloria Amegatcher^{1,2}, Jack D. Sunter³ and Theresa Manful Gwira^{1,2*}

Trypanosoma brucei Parasites Occupy and Functionally Adapt to the Adipose Tissue in Mice

Sandra Trindade,^{1,9} Filipa Rijo-Ferreira,^{1,2,3,9} Tânia Carvalho,¹ Daniel Pinto-Neves,¹ Fabien Guegan,¹ Francisco Aresta-Branco,¹ Fabio Borito,¹ Simon A. Young,⁷ Andreia Pinto,¹ Jan Van Den Abbeele,^{5,6} Ruy M. Ribeiro,^{4,8} Sérgio Dias,¹ Terry K. Smith,⁷ and Luisa M. Figueiredo^{1,7}

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⁹Co-first author

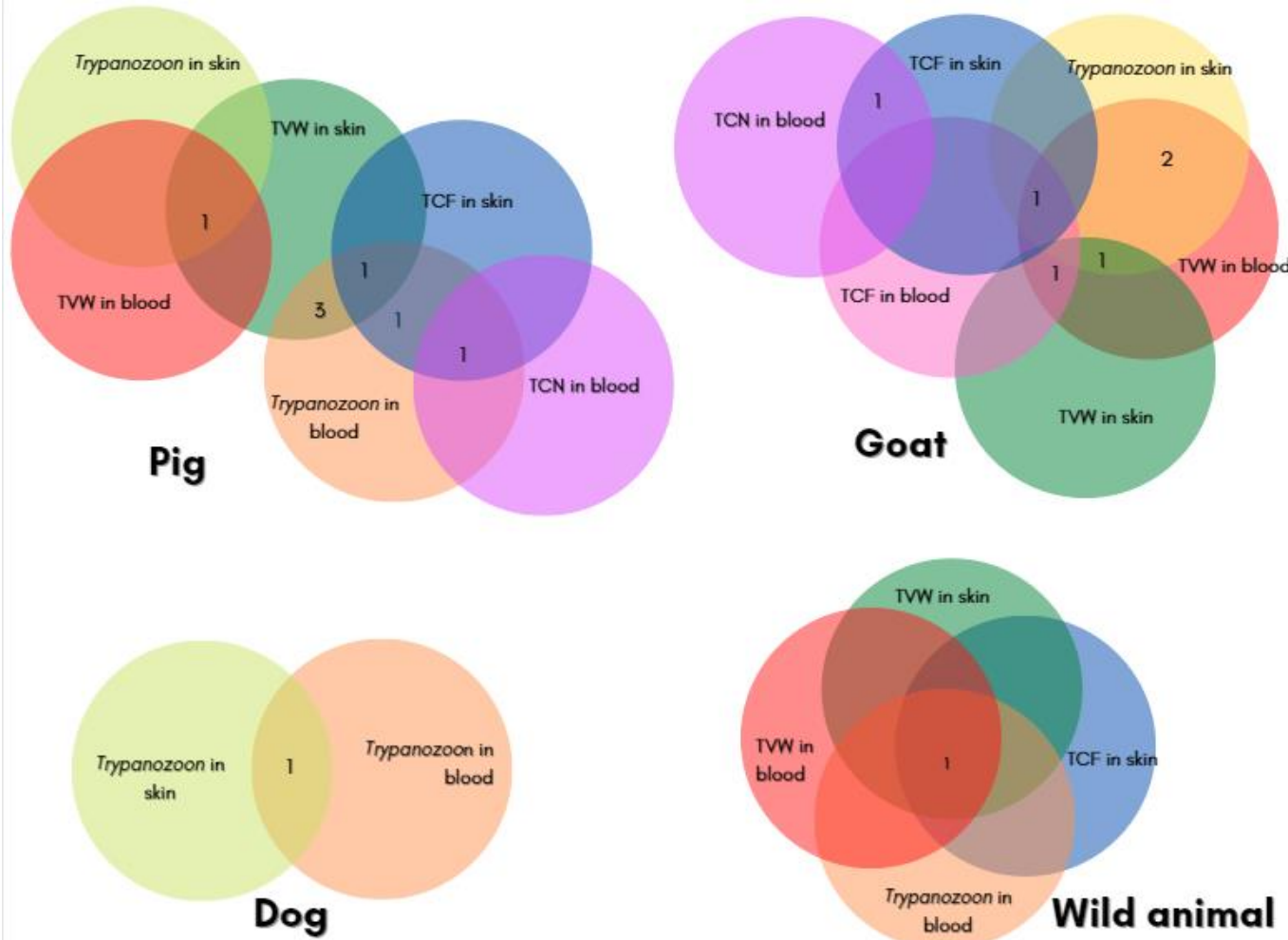
*Correspondence: lmf@medicina.ulisboa.pt

<http://dx.doi.org/10.1016/j.chom.2016.05.002>



Introduction 4/5

❖ Trypanosomes in the skin of naturally infected animals: A threat for AAT control

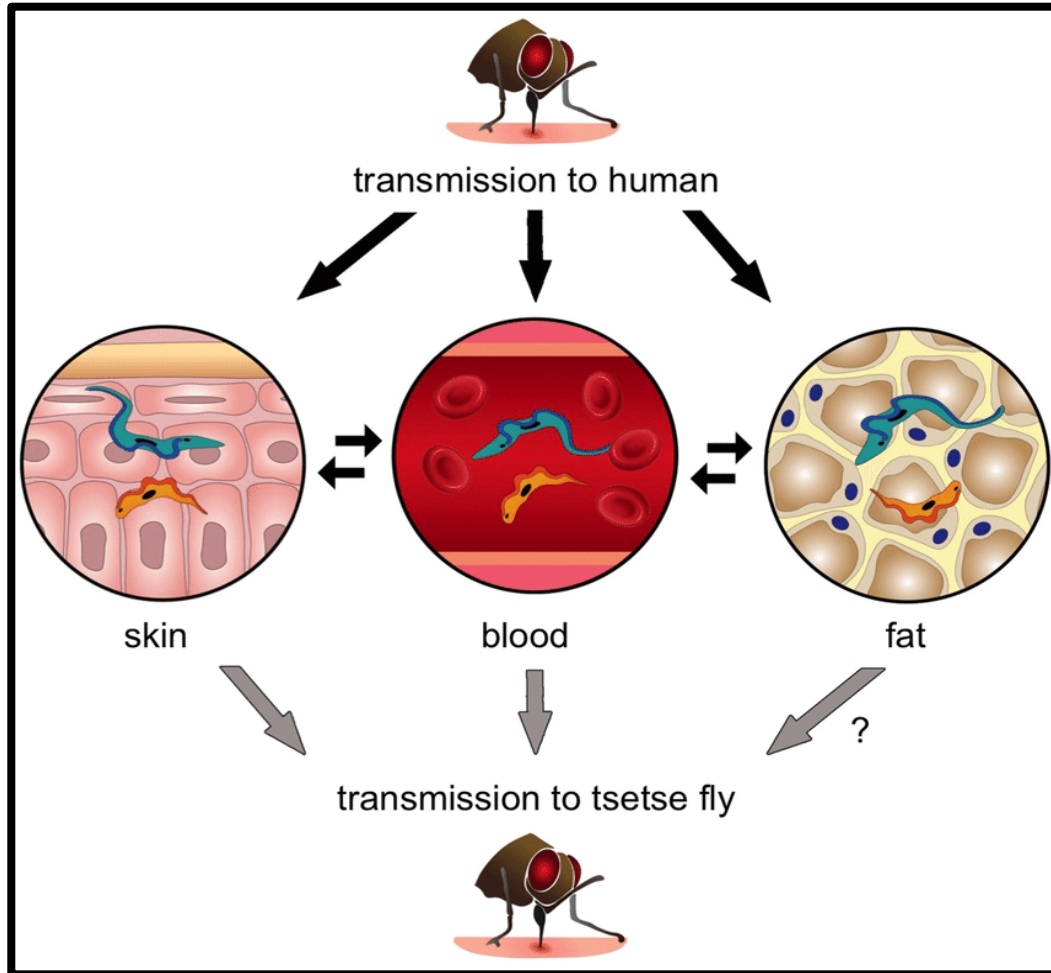


TROPICAL DISEASES

RESEARCH ARTICLE

Prevalence of blood and skin trypanosomes in domestic and wild fauna from two sleeping sickness foci in Southern Cameroon

Eugenie Melaine Kemta Magang^{1,2}, Rolin Mitteran Ndefo Kamga¹, Jenny Telleria², Magali Tichit³, Aline Crouzols⁴, Jacques Kaboré⁵, David Hardy³, Calmes Ursain Tsakeng Bouaka⁶, Vincent Jamonneau^{2,7}, Brice Rotureau^{4,8}, Victor Kuete⁹, Jean-Mathieu Bart², Gustave Simo¹✉*

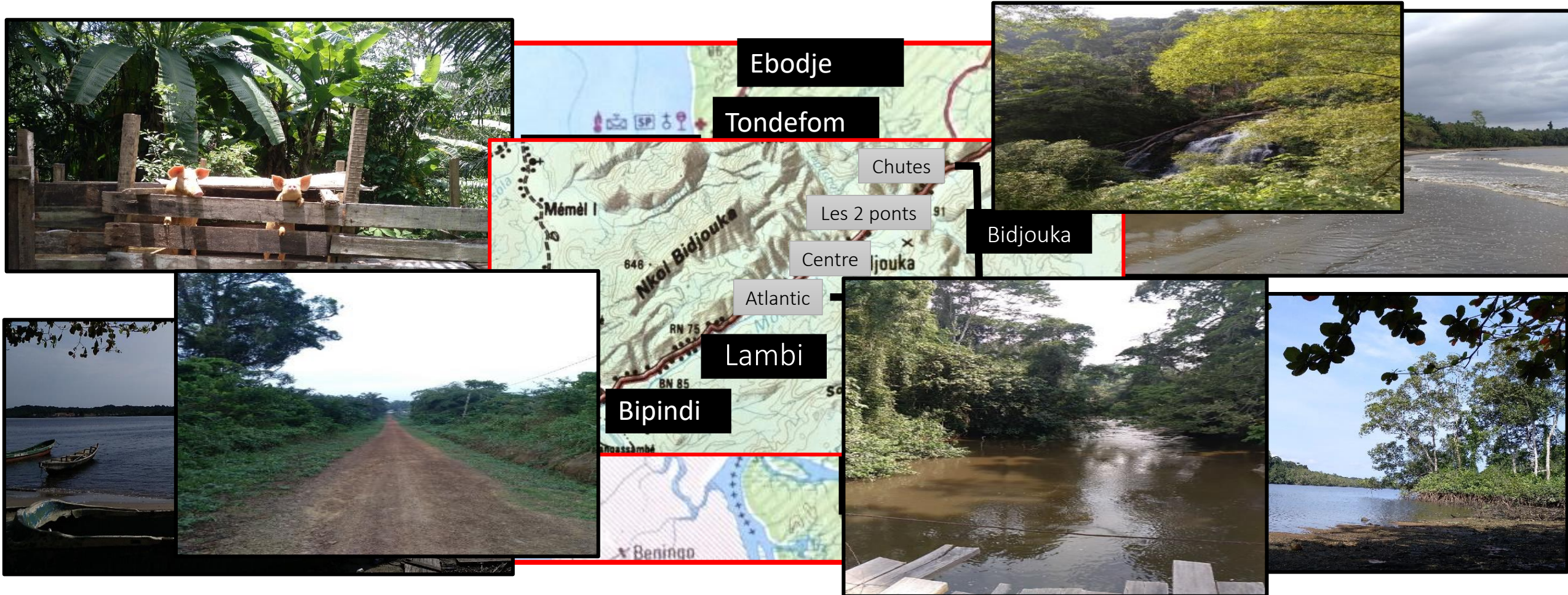


- Do trypanosomes found in blood differ from those found in blood?

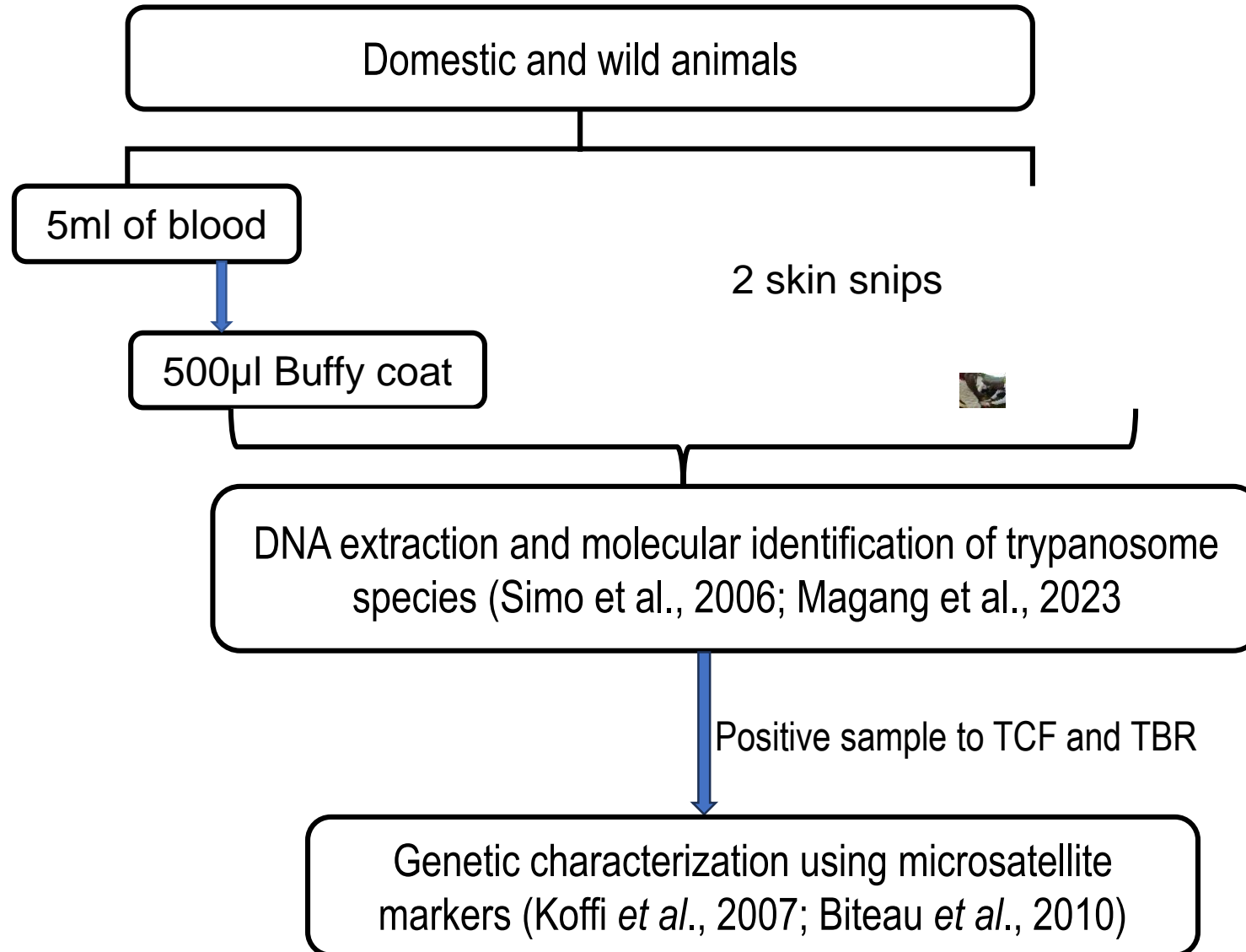
Genetically characterize trypanosomes circulating in the blood and in the skin of domestic animals of
HAT foci of Campo and Bipindi in Cameroon

Methodology 1/2

➤ Study area

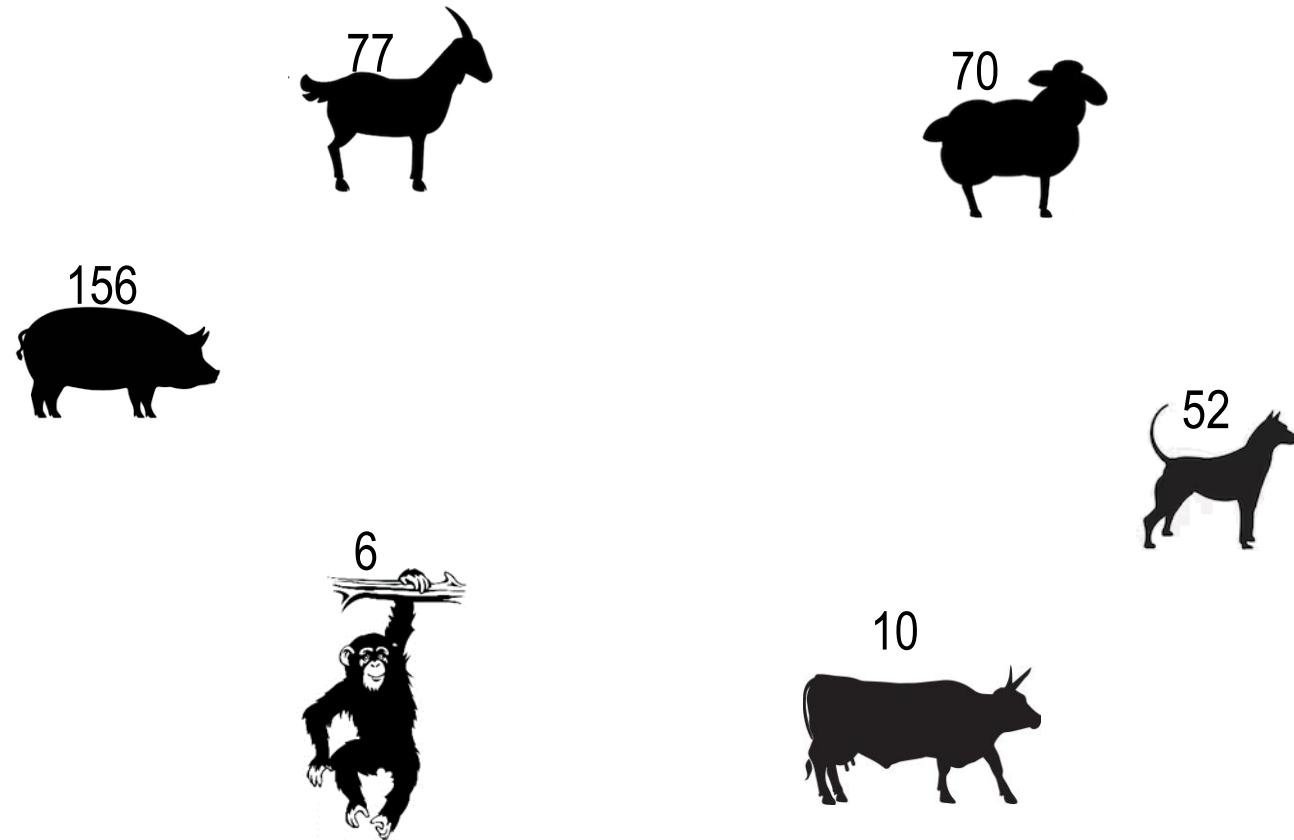


Methodology 2/2



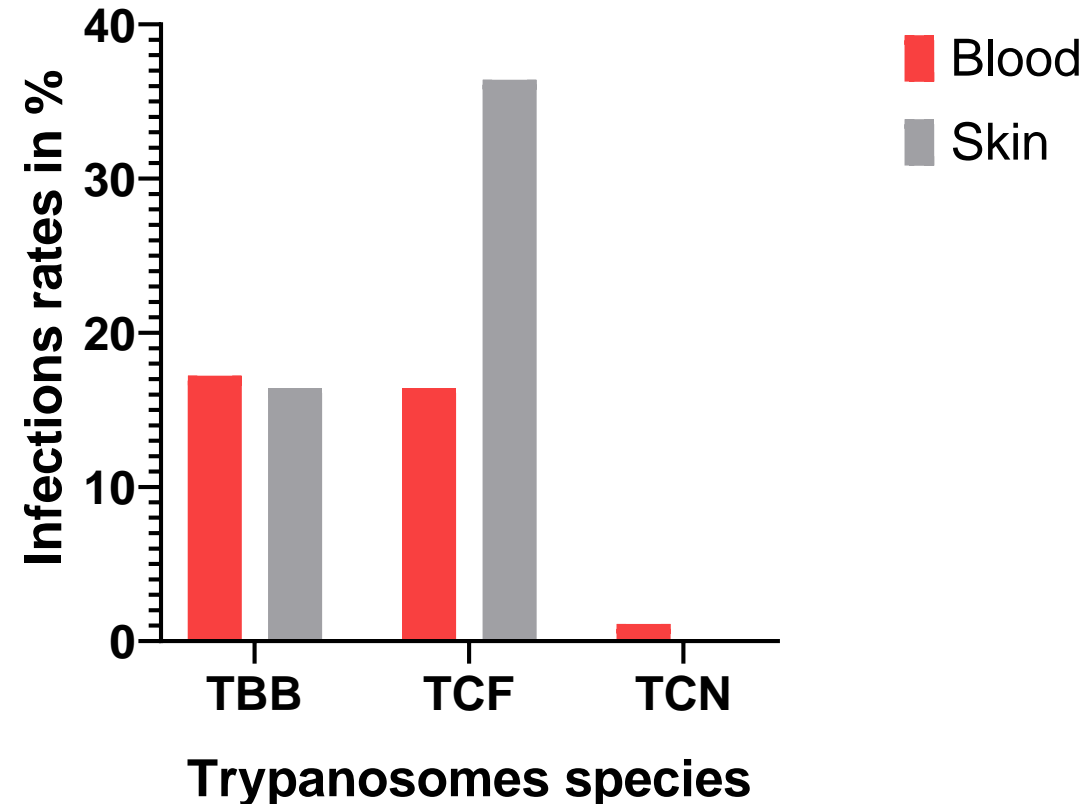
Results and discussion 1/6

❖ 371 blood and skin samples collected



Results and discussion 2/6

- ❖ Of the 371 analysed blood samples, 113 (30.7%) had trypanosomes: 40.69 in Bipindi and 27.4 in Campo
- ❖ Of the 137 skin samples analysed, 51 (36.5%) had trypanosomes: 42.7% in Bipindi and 14.8% in Campo



Results and discussion 3/6

❖ Distribution of *T. congolense* alleles according to tissue and loci

Tissue types	Genotypes (size1/size2/size3)		
	TCM2	TCM4	TCM6
Blood	152/152 (30)	154/154 (25)	155/155 (1)
	158/158 (4)	156/156 (3)	155/160 (1)
	152/199 (2)	154/186 (16)	160/160 (7)
		186/232 (1)	199/199 (13)
		154/186/232 (1)	160/199 (3)
			251/251 (13)
			160/251 (3)
			150/150 (1)
Skin	152/152 (34)	154/154 (29)	160/160 (13)
	158/158 (1)	154/186 (3)	199/199 (7)
	152/175 (1)	186/186 (1)	160/199 (3)
		186/232 (1)	251/251 (7)
			160/251 (1)

In bold: specific alleles to either blood or skin

- Six microsatellite loci
 - 17 distinct alleles identified across these microsatellite loci,
 - with 15 observed only in the blood and 12 in the skin
-
- Some alleles were found to be specific to each tissue

Results and discussion 4/6

❖ Distribution of *T. congolense* alleles according to tissue, loci and HAT foci

Foci	Genotypes (size1/size2/size3)					
	TCM2		TCM4		TCM6	
	Blood	Skin	Blood	Skin	Blood	Skin
-	152/152 (7)	152/152 (3)	154/154 (5)	186/232 (1)	160/160 (4)	251/251 (1)
	152/199 (1)		156/156 (1)	186/186 (1)	199/199 (1)	160/160 (1)
			154/186 (2)	154/154 (1)		199/199 (1)
Campo	152/152 (32)	152/152 (22)	154/154 (23)	154/156 (6)	150/150 (1)	160/160 (8)
	158/158 (4)	152/175 (1)	156/156 (2)	154/154 (25)	155/155 (1)	160/199 (3)
	152/199 (1)	158/158 (1)	154/156 (11)		155/160 (1)	199/199 (8)
			186/232 (1)		160/160 (8)	160/251 (1)
			154/186/232 (1)		160/199 (3)	251/251 (9)
					199/199 (10)	
					160/251 (3)	
					251/251 (10)	

In bold: Genotypes specific to either blood or skin;

In red: Genotypes specific to HAT focus

- high frequency of some alleles in all the villages and all animal species, even depending on the focus, making them the predominant alleles (Simo *et al.*, 2011)

Results and discussion 5/6

❖ Distribution of *T. brucei* s.l. alleles according to tissue and loci

Tissue	Genotypes (size1/size2/size3/size4)			
	M6C8	MT3033	MICBG6	MICBG1
Blood	183/195	196/202	214/214	187/195/206
	183/183	197/202	214/223	187/187
	184/184	198/202	215/224	222/225
	184/201/203	202/202 (2)	215/225 (3)	212/216/218/223
	184/191	193/195/199	215/225/227 (2)	186/186
	188/205	195/199	215/222 (3)	199/205
	192/208	199/199		185/185
	185/190/194	185/189		219/222
	198/198	51/194		218/219/221
	207/207	198/198		213/221
	199/199	195/195		218/221/223
	199/208	196/196		215/222/226
	181/194/203	51/184		220/220
	66/86/267	51/186		
	34/206/235	51/200		
		51/187		
	Skin	193/217	206/267	212/216/224
182/217		154/314	212/216/225	183/189/213
180/217/236		154/175	212/216/226	204/204
175/213/219		213/335/448	212/216/227	185/205
180/183/219		66/213/335	212/216/224	187/201
183/198/200/203/217		58/86/227	203/205	186/187/200/202/206
183/221		86/314/335	203/204/208	182/185/208/213
180/183/187/221			202/204/208 (2)	195/206
180/183				212/212
219/219				
191/221				

- 8 microsatellite loci
- Allelic polymorphism shows M6C8 with 25 alleles; MT3033 with 21 alleles ; MICBG6 with 10 alleles; MICBG1 with 20 alleles

- More alleles were found to be specific to each tissue

In bold: alleles found in both blood and skin

Results and discussion 6/6

❖ Distribution of *T. brucei* s.l. alleles according to tissues and HAT foci

Foci	Genotypes (size1/size2/size3/size4)							
	M6C8		MT3033		MICBG6		MICBG1	
	Blood	Skin	Blood	Skin	Blood	Skin	Blood	Skin
Campo	199/199	/	51/184		215/222 (3)		185/185	
	199/208		185/189		215/225		199/205	
	34/206/235		51/187		215/225/227		213/221	
	207/207		195/195				218/219/221	
	188/205		196/196				218/221/223	
	192/208		199/199				219/222	
	198/198		51/200				220/220	
	181/194/203		202/202				215/222/226	
	185/190/194		198/198				226/226	
66/86/267		51/194						
Bipindi	183/195	175/213/219	198/202	206/267	214/214	202/204/208 (2)	186/186	183/189/213
	184/191	184/184	202/202	58/86/227	215/224	203/204/208	187/187	187/201
	183/183	219/219	196/202	154/175	215/225(2)	203/205	187/195/206	195/197/206
	184/201/203	193/217	197/202	154/314	214/223	212/216/224	212/216/218/223	200/200
	184/184	191/221	193/195/199	66/213/335	225/227		222/225	186/187/200/202/206
		183/221	195/199	213/335/448				185/205

In bold: Genotypes common to both HAT foci

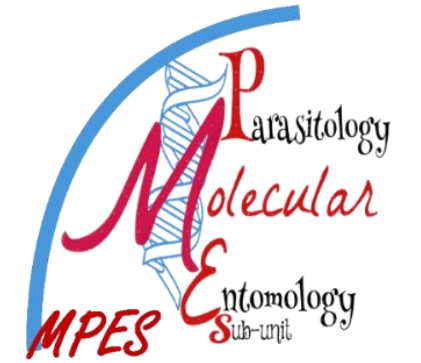
180/183
180/186/187/221
183/198/200/203/

Take home messages

- ❑ Skin is a reservoir for different trypanosomes species in animals
- ❑ Some alleles and genotypes were found to be tissue-specific; some were specific to some bioecological settings or HAT foci
- ❑ Trypanosomes may adapt to specific microenvironments, potentially influencing the transmission dynamics



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attention*

