

BIOGRAPHICAL SKETCH

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NAME: Antonio Charlys da Costa

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POSITION TITLE: Postdoctoral researcher – Tropical Medicine Institute, University of São Paulo

EDUCATION/TRAINING INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Paulista University, Sao Paulo, SP, Brazil	BPharm	2010	Pharmacy and Biochemistry
University of Sao Paulo, Sao Paulo, SP, Brazil	PhD	2017	Tropical Medicine
Blood Systems Research Institute, San Francisco, CA, USA	PhD	2014-15	Viral Metagenomics

A. Personal Statement

I have established a collaboration with Dr Eric Delwart to perform virus discovery with the participation of my PhD (2014-15) with support of FAPES and we have described several new virus strains.

B. Positions and Honors**Positions and Employment**

1994 – 1997 Administrative position, Architecture Office, Sao Paulo, Brazil
 1998 – 2010 Administrative position, Federal University of São Paulo, Sao Paulo, Brazil
 2010 – 2012 Trainee, Dept Hematology, University of Sao Paulo.
 2012 – 2012 Trainee, Blood Systems Research Institute, San Francisco, CA, USA

C. Contribution to Science**1. Viral Diversity**

I started my carrier working two years (2010-2012) in the laboratory of Dr. Ester Sabino, Department of Molecular Biology, Fundação Pró-Sangue/Hemocentro de Sao Paulo. During this period, I acquired a comprehensive knowledge of molecular biology and infectious diseases relevant to transfusion medicine, and had extensive hands-on training in a variety of serological and molecular techniques, including polymerase chain reaction (PCR), quantitative (qPCR) and DNA sequencing. I have participated in different projects that included: analysis of HIV-1 diversity in Brazil, HTLV and B19 diversity in Sao Paulo, Brazil.

- a. Investigation of human parvovirus B19 occurrence and genetic variability in different leukaemia entities. **Costa AC**, Bendit I, de Oliveira ACS, Kallas EG, Sabino EC, Sanabani SS. **Clin Microbiol Infect.** 2013 Jan;19(1):E31-E43.
- b. Frequency of subtype B and F1 dual infection in HIV-1 positive, Brazilian men who have sex with men. Soares de Oliveira AC, Pessôa de Farias R, **Costa AC**, Sauer MM, Bassichetto KC, Oliveira SM, Costa PR, Tomiyama C, Tomiyama HT, Sabino EC, Kallas EG, Sanabani SS. **Virol J.** 2012 Sep 29;9:223.
- c. Parvovirus among patients with cytopenia of unknown origin in Brazil: a case-control study. Garcia Sde O, Kleine Neto W, **Costa AC**, Sanabani SS, Mendrone A Jr, Pereira J, Sabino EC. **J Clin Microbiol.** 2011 Apr;49(4):1578-80.

- d. Characterization of partial and near full-length genomes of HIV-1 strains sampled from recently infected individuals in São Paulo, Brazil. Sanabani SS, Pastena ER, **Costa AC**, Martinez VP, Kleine-Neto W, de Oliveira AC, Sauer MM, Bassichetto KC, Oliveira SM, Tomiyama HT, Sabino EC, Kallas EG. **PLoS One**. 2011;6(10):e25869.
- e. Correlation between LTR point mutations and proviral load levels among human T cell lymphotropic virus type 1 (HTLV-1) asymptomatic carriers. Neto WK, **Costa AC**, de Oliveira AC, Martinez VP, Nukui Y, Sabino EC, Sanabani SS. **Virology**. 2011 Dec 13;8:535.
- f. Evaluation of HIV-1 resistance to antiretroviral drugs among 150 patients after six months of therapeutic interruption. Kalmar EM, Sanabani SS, **Costa AC**, Ferreira S, Barreto CC, Chen S, Sabino EC. **Int J STD AIDS**. 2012 Feb;23(2):120-5.
- g. Lack of evidence to support the association of a single IL28B genotype SNP rs12979860 with the HTLV-1 clinical outcomes and proviral load. Sanabani SS, Nukui Y, Pereira J, **da Costa AC**, de Oliveira AC, Pessôa R, Leal FE, Segurado AC, Kallas EG, Sabino EC. **BMC Infect Dis**. 2012 Dec 23;12:374.

2. Viral metagenomics

During my PhD (2012-2017) in the Tropical Medicine at University of Sao Paulo, with support from the Sao Paulo Research Foundation, I receive training grant for stay on Blood Systems Research Institute/UCSF (2014-2015). During this period I acquired a comprehensive knowledge of viral metagenomics, virus discovery and viral evolution, and had extensive hands on training in a variety of bioinformatics and molecular techniques, including phylogenetic analyses, assembly genomes, Next Generation of Sequencing, molecular cloning.

- a. A new densovirus in cerebrospinal fluid from a case of anti-NMDA-receptor encephalitis. Phan TG, Messacar K, Dominguez SR, **Costa AC**, Deng X, Delwart E. **Arch Virol**. 2016 Nov;161(11):3231-5.
- b. A new protoparvovirus in human fecal samples and cutaneous T cell lymphomas (mycosis fungoides). Phan TG, Dreno B, **Costa AC**, Li L, Orlandi P, Deng X, Kapusinszky B, Siqueira J, Knol AC, Halary F, Dantal J, Alexander KA, Pesavento PA, Delwart E. **Virology**. 2016 Sep;496:299-305.
- c. The fecal virome of South and Central American children with diarrhea includes small circular DNA viral genomes of unknown origin. Phan TG, **Costa AC**, Del Valle Mendoza J, Bucardo-Rivera F, Nordgren J, O'Ryan M, Deng X, Delwart E. **Arch Virol**. 2016 Apr;161(4):959-66.
- d. A new gyrovirus in human feces. Phan TG, **Costa AC**, Zhang W, Pothier P, Ambert-Balay K, Deng X, Delwart E. **Virus Genes**. 2015 Aug;51(1):132-5.
- e. Virome analysis of antiretroviral-treated HIV patients shows no correlation between T-cell activation and anelloviruses levels. Li L, Deng X, **Costa AC**, Bruhn R, Deeks SG, Delwart E. **J Clin Virol**. 2015 Nov;72:106-13
- f. A diverse group of small circular ssDNA viral genomes in human and non-human primate stools. Ng TF, Zhang W, Sachsenröder J, Kondov NO, **Costa AC**, Vega E, Holtz LR, Wu G, Wang D, Stine CO, Antonio M, Mulvaney US, Muench MO, Deng X, Ambert-Balay K, Pothier P, Vinjé J, Delwart E. **Virus Evol**. 2015 Dec 31;1(1):vev017.

3. **Arbovirus epidemics and viral metagenomics in Brazil**

We have established a productive research area in our laboratory based on expertise acquired in Blood Systems Research Institute training. We have participated in the UK-Brazil ZIBRA project that helped define the dates of Zika introduction and spread in Brazil and how yellow fever is spreading.

- a. First Detection of DS-1-like G1P[8] Double-gene Reassortant Rotavirus Strains on The American Continent, Brazil, 2013. Luchs A, **Costa AC**, Cilli A, Komninakis SCV, Carmona RCC, Morillo SG, Sabino EC, Timenetsky MDCST. **Sci Rep**. 2019 Feb 18;9(1):2210.

- b. Detection of RNA-Dependent RNA Polymerase of Hubei Reo-Like Virus 7 by Next-Generation Sequencing in *Aedes aegypti* and *Culex quinquefasciatus* Mosquitoes from Brazil. Ribeiro GO, Monteiro FJC, Rego MODS, Ribeiro ESD, Castro DF, Caseiro MM, Souza Marinho RDS, Komninakis SV, Witkin SS, Deng X, Delwart E, Sabino EC, **Costa AC**, Leal É. **Viruses**. 2019 Feb 10;11(2). pii: E147.
- c. Detection and Characterization of Enterovirus B73 from a Child in Brazil. Ribeiro GO, Luchs A, Milagres FAP, Komninakis SV, Gill DE, Lobato MCABS, Brustulin R, Chagas RTD, Abrão MFNDS, Soares CVDA, Witkin SS, Villanova F, Deng X, Sabino EC, Delwart E, **Costa AC**, Leal É. **Viruses**. 2018 Dec 28;11(1). pii: E16.
- d. A Novel Highly Divergent Strain of Cell Fusing Agent Virus (CFAV) in Mosquitoes from the Brazilian Amazon Region. Fernandes LN, Coletti TM, Monteiro FJC, Rego MODS, Ribeiro ESD, Ribeiro GO, Marinho RDSS, Komninakis SV, Witkin SS, Deng X, Delwart E, Sabino EC, Leal É, **Costa AC**. **Viruses**. 2018 Nov 24;10(12). pii: E666.
- e. Spread of the emerging equine-like G3P[8] DS-1-like genetic backbone rotavirus strain in Brazil and identification of potential genetic variants. Luchs A, **Costa AC**, Cilli A, Komninakis SCV, Carmona RCC, Boen L, Morillo SG, Sabino EC, Timenetsky MDCST. **J Gen Virol**. 2019 Jan;100(1):7-25.
- f. Recombination Located over 2A-2B Junction Ribosome Frameshifting Region of Saffold Cardiovirus. **Costa AC**, Luchs A, Milagres FAP, Komninakis SV, Gill DE, Lobato MCABS, Brustulin R, das Chagas RT, Abrão MFNDS, Soares CVDA, Deng X, Sabino EC, Delwart E, Leal É. **Viruses**. 2018 Sep 24;10(10). pii: E520.
- g. Genomic and epidemiological monitoring of yellow fever virus transmission potential. Faria NR, Kraemer MUG, Hill SC, Goes de Jesus J, Aguiar RS, Iani FCM, Xavier J, Quick J, du Plessis L, Dellicour S, Thézé J, Carvalho RDO, Baele G, Wu CH, Silveira PP, Arruda MB, Pereira MA, Pereira GC, Lourenço J, Obolski U, Abade L, Vasylyeva TI, Giovanetti M, Yi D, Weiss DJ, Wint GRW, Shearer FM, Funk S, Nikolay B, Fonseca V, Adelino TER, Oliveira MAA, Silva MVF, Sacchetto L, Figueiredo PO, Rezende IM, Mello EM, Said RFC, Santos DA, Ferraz ML, Brito MG, Santana LF, Menezes MT, Brindeiro RM, Tanuri A, Dos Santos FCP, Cunha MS, Nogueira JS, Rocco IM, **Costa AC**, Komninakis SCV, Azevedo V, Chieppe AO, Araujo ESM, Mendonça MCL, Dos Santos CC, Dos Santos CD, Mares-Guia AM, Nogueira RMR, Sequeira PC, Abreu RG, Garcia MHO, Abreu AL, Okumoto O, Kroon EG, de Albuquerque CFC, Lewandowski K, Pullan ST, Carroll M, de Oliveira T, Sabino EC, Souza RP, Suchard MA, Lemey P, Trindade GS, Drumond BP, Filippis AMB, Loman NJ, Cauchemez S, Alcantara LCJ, Pybus OG. **Science**. 2018 Aug 31;361(6405):894-899.
- h. Rapid diagnosis of Zika virus through saliva and urine by Loop-mediated isothermal amplification (LAMP). Castro T, Sabalza M, Barber C, Abrams W, **Costa AC**, De Pádua Milagres FA, Braz-Silva PH, Malamud D, Gallottini M. **J Oral Microbiol**. 2018 Sep 3;10(1):1510712.
- i. Near full length genome of a recombinant (E/D) cosavirus strain from a rural area in the central region of Brazil. **Costa AC**, Luchs A, Milagres FAP, Komninakis SV, Gill DE, Lobato MCABS, Brustulin R, das Chagas RT, Abrão MFNDS, Soares CVDA, Deng X, Sabino EC, Delwart E, Leal É. **Sci Rep**. 2018 Aug 17;8(1):12304.
- j. Complete Genome Sequences of Six Human Bocavirus Strains from Patients with Acute Gastroenteritis in the North Region of Brazil. Watanabe ASA, Luchs A, Leal É, Milagres FAP, Komninakis SV, Gill DE, Lobato MCABS, Brustulin R, das Chagas RT, Abrão MFNDS, Soares CVDA, Deng X, Sabino EC, Delwart E, **Costa AC**. **Genome Announc**. 2018 Apr 26;6(17).
- k. Wuhan large pig roundworm virus identified in human feces in Brazil. Luchs A, Leal E, Komninakis SV, de Pádua Milagres FA, Brustulin R, da Aparecida Rodrigues Teles M, Gill DE, Deng X, Delwart E, Sabino EC, **Costa AC**. **Virus Genes**. 2018 Jun;54(3):470-473.

- l. Genomic and epidemiological characterisation of a dengue virus outbreak among blood donors in Brazil. Faria NR, **Costa AC**, Lourenço J, Loureiro P, Lopes ME, Ribeiro R, Alencar CS, Kraemer MUG, Villabona-Arenas CJ, Wu CH, Thézé J, Khan K, Brent SE, Romano C, Delwart E, Custer B, Busch MP, Pybus OG, Sabino EC; NHLBI Recipient Epidemiology and Donor Evaluation Study-III (REDS-III). **Sci Rep.** 2017 Nov 9;7(1):15216.
- m. Spread of Chikungunya Virus East/Central/South African Genotype in Northeast Brazil. **Costa AC**, Thézé J, Komninakis SCV, Sanz-Duro RL, Felinto MRL, Moura LCC, Barroso IMO, Santos LEC, Nunes MAL, Moura AA, Lourenço J, Deng X, Delwart EL, Guimarães MRDAS, Pybus OG, Sabino EC, Faria NR. **Emerg Infect Dis.** 2017 Oct;23(10):1742-1744.
- n. Establishment and cryptic transmission of Zika virus in Brazil and the Americas. Faria NR, Quick J, Claro IM, Thézé J, de Jesus JG, Giovanetti M, Kraemer MUG, Hill SC, Black A, **Costa AC**, Franco LC, Silva SP, Wu CH, Raghwanji J, Cauchemez S, du Plessis L, Verotti MP, de Oliveira WK, Carmo EH, Coelho GE, Santelli ACFS, Vinhal LC, Henriques CM, Simpson JT, Loose M, Andersen KG, Grubaugh ND, Somasekar S, Chiu CY, Muñoz-Medina JE, Gonzalez-Bonilla CR, Arias CF, Lewis-Ximenez LL, Baylis SA, Chieppe AO, Aguiar SF, Fernandes CA, Lemos PS, Nascimento BLS, Monteiro HAO, Siqueira IC, de Queiroz MG, de Souza TR, Bezerra JF, Lemos MR, Pereira GF, Loudal D, Moura LC, Dhalia R, França RF, Magalhães T, Marques ET Jr, Jaenisch T, Wallau GL, de Lima MC, Nascimento V, de Cerqueira EM, de Lima MM, Mascarenhas DL, Neto JPM, Levin AS, Tozetto-Mendoza TR, Fonseca SN, Mendes-Correa MC, Milagres FP, Segurado A, Holmes EC, Rambaut A, Bedford T, Nunes MRT, Sabino EC, Alcantara LCJ, Loman NJ, Pybus OG. **Nature.** 2017 Jun 15;546(7658):406-410.

D. Research Support

Ongoing Research Support

2018/14389-0 Ester Sabino (PI) 04/01/19 – 03/31/22
 FAPESP
 UK-Brazil Joint Centre for Arbovirus Discovery, Diagnosis, Genomics and Epidemiology (CADDE).
 Role: Investigator

Completed Research

2016/01735-2 Ester Sabino (PI) 02/01/17 – 01/31/19
 FAPESP
 Viral metagenomics to track, explain and predict the transmission and spatiotemporal spread of Dengue and Chikungunya viruses in Brazil
 Role: Investigator