



# **Corrigendum: Duration of Humoral and Cellular Immunity 8 Years After Administration of Reduced Doses of the 17DD-Yellow Fever Vaccine**

Ismael Artur da Costa-Rocha<sup>1</sup>, Ana Carolina Campi-Azevedo<sup>1\*</sup>, Vanessa Peruhype-Magalhães<sup>1</sup>, Jordana Grazziela Coelho-dos-Reis<sup>1,2</sup>, Jordana Rodrigues Barbosa Fradico<sup>1</sup>, Thalles Souza-Lopes<sup>1</sup>, Laise Rodrigues Reis<sup>1</sup>, Larissa Chaves Freire<sup>1</sup>, Christiane Costa-Pereira<sup>1</sup>, Juliana Vaz de Melo Mambrini<sup>3</sup>, Maria de Lourdes de Sousa Maia<sup>4</sup>, Sheila Maria Barbosa de Lima<sup>5</sup>, Tatiana Guimarães de Noronha<sup>4</sup>, Janaina Reis Xavier<sup>4</sup>, Luiz Antonio Bastos Camacho<sup>6</sup>, Elizabeth Maciel de Albuquerque<sup>4</sup>, Roberto Henrique Guedes Farias<sup>7</sup>, Thalita da Matta de Castro<sup>4</sup>, Akira Homma<sup>4</sup>, Alessandro Pecego Martins Romano<sup>8</sup>, Carla Magda Domingues<sup>8</sup>, Reinaldo de Menezes Martins<sup>4</sup>, Andréa Teixeira-Carvalho<sup>1</sup> and Olindo Assis Martins-Filho<sup>1\*</sup>

### **OPEN ACCESS**

#### Edited and reviewed by:

Karl Ljungberg, Eurocine Vaccines AB, Sweden

#### \*Correspondence:

Ana Carolina Campi-Azevedo campiazevedo@gmail.com Olindo Assis Martins-Filho oassismartins@gmail.com

#### Specialty section:

This article was submitted to Vaccines and Molecular Therapeutics, a section of the journal Frontiers in Immunology

> Received: 09 September 2019 Accepted: 30 September 2019 Published: 22 October 2019

#### Citation:

Costa-Rocha IAd, Campi-Azevedo AC, Peruhype-Magalhães V, Coelho-dos-Reis JG, Fradico JRB, Souza-Lopes T, Reis LR, Freire LC, Costa-Pereira C. Mambrini JVdM. Maia MdLdS, Lima SMBd, Noronha TGd, Xavier JR, Camacho LAB, Albuquerque EMd, Farias RHG, Castro TdMd, Homma A, Romano APM, Domingues CM, Martins RdM, Teixeira-Carvalho A and Martins-Filho OA (2019) Corrigendum: Duration of Humoral and Cellular Immunity 8 Years After Administration of Reduced Doses of the 17DD-Yellow Fever Vaccine. Front. Immunol. 10:2433. doi: 10.3389/fimmu.2019.02433

<sup>1</sup> Grupo Integrado de Pesquisas em Biomarcadores, Instituto René Rachou, Fundação Oswaldo Cruz – FIOCRUZ-Minas, Belo Horizonte, Brazil, <sup>2</sup> Laboratório de Virologia Básica e Aplicada, Departamento de Microbiologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil, <sup>3</sup> Núcleo de Estudos em Saúde Pública e Envelhecimento, Instituto René Rachou, Fundação Oswaldo Cruz – FIOCRUZ-Minas, Belo Horizonte, Brazil, <sup>4</sup> Assessoria Clínica, Instituto de Tecnologia em Imunobiológicos Bio-Manguinhos – FIOCRUZ, Rio de Janeiro, Brazil, <sup>5</sup> Laboratório de Tecnologia Virológica, Instituto de Tecnologia em Imunobiológicos Bio-Manguinhos – FIOCRUZ, Rio de Janeiro, Brazil, <sup>6</sup> Departamento de Epidemiologia e Métodos Quantitativos em Saúde - Escola Nacional de Saúde Pública – FIOCRUZ, Rio de Janeiro, Brazil, <sup>7</sup> Instituto de Biologia do Exército, Rio de Janeiro, Brazil, <sup>8</sup> Departamento de Vigilância das Doenças Transmissíveis, Secretaria de Vigilância em Saúde, Ministério da Saúde, Brasília, Brazil

Keywords: Yellow Fever, 17DD vaccine, subdoses, neutralizing antibodies, cellular memory

### A Corrigendum on

## Duration of Humoral and Cellular Immunity 8 Years After Administration of Reduced Doses of the 17DD-Yellow Fever Vaccine

by Costa-Rocha, I. A. d., Campi-Azevedo, A. C., Peruhype-Magalhães, V., Coelho-dos-Reis, J. G., Fradico, J. R. B., Souza-Lopes, T., et al. (2019). Front. Immunol. 10:1211. doi: 10.3389/fimmu.2019.01211

In the original article, there was a mistake in **Figure 5** as published. One orange frame erroneously shifted slightly to the right. The corrected **Figure 5** appears below.

Additionally, there was a mistake in **Supplementary Figure 2** as published. The asterisks indicating statistical significance were erroneously deleted during the JPEG conversion. It is important to mention that no results have been modified. The corrected **Supplementary Figure 2** appears below.

The authors apologize for these errors and state that they do not change the scientific conclusions of the article in any way. The original article has been updated.

Copyright © 2019 Costa-Rocha, Campi-Azevedo, Peruhype-Magalhães, Coelho-dos-Reis, Fradico, Souza-Lopes, Reis, Freire, Costa-Pereira, Mambrini, Maia, Lima, Noronha, Xavier, Camacho, Albuquerque, Farias, Castro, Homma, Romano, Domingues, Martins, Teixeira-Carvalho and Martins-Filho. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

1



**FIGURE 5** Biomarker network matrices 8-years after 17DD-YF primary vaccination with different doses. The biomarker network of YF-specific humoral and cellular memory was built to define the connections between PRNT levels ( $log_{10}$  mIU/mL), phenotypic (NCD4, eEfCD4, CMCD4, EMCD4, NCD8, eEfCD8, CMCD8, EMCD8, NCD19, nCMCD19, and CMCD19) and functional memory attributes (TNFCD4, IENCD4, IL10CD4, IL5CD4, TNFCD8, IENCD8, IL10CD8, IL5CD8, TNFCD19, IL10CD19, and IL5CD19). Correlation analysis were carried out for six vaccinees groups, according to the dose of 17DD-YF vaccine administered in 2009: 27,476IU, considered the reference dose; 10,447IU; 3,013IU; 587IU; 158IU, and 31IU. Matrices were assembled in dotted template with each dot representing a correlation axis between two attributes. Color keys were employed to identify significant Spearman's correlation "r" indices at p < 0.05, referred as positive (red scale, **matheted**, r(+) ranging from 0.5 to 1.0) or negative (green scale, **matheted**, r(-) ranging from -1.0 to -0.5). Non-significant correlations are represented by white dots. Ratio between positive and negative correlations "r(+)/r(-)" are provided in the Figure. The common correlations across distinct 17DD-YF vaccine doses are highlighted by orange frames.



Supplementary Figure 2 | Duration of YF-specific PRNT and EMCD8 profiles 8-years after primary vaccination with routine full dose or administration of different subdoses of 17DD-YF vaccine. The YF-specific PRNT and EMCD8 profile were compared amongst volunteers who received routine full dose, referred as: NV(day0)/([], n=46); PV(day30-45)/([], n=34); PV(year7-9)/([], n=46); PV(year<10)/([], n=34) and PV(year8) vaccinees who received subdoses, named: 27,476IU/([], n=16); 10,447IU/([], n=17); 3,013IU/([], n=19); 587IU/([], n=17); 158IU/([], n=18) and 31IU/([], n=11). Combined analysis was performed using the results from the current investigation and the database from another study carried out by our own group (22), in which the participants received the "routine" full dose of 17DD-YF vaccine. The data were obtained using the same methods in both studies, as described in Material and Methods. The PRNT levels are expressed in geometric mean titer and 95%CI of log10 mIU/mL. EMCD8 levels are presented as17DD-YF Ag/CC Index. Comparative analysis amongst groups were assessed by ANOVA adjusted to multiple comparisons and significant differences at p<0.05 highlighted by asterisk (\*) as compared to NV(day0). The gray zone highlights the median values observed for non-vaccinated controls.