Modulation of interferon-gamma response to QuantiFERON-TB-plus detected by enzyme-linked immunosorbent assay in patients with active and latent tuberculosis infection

Elisa Petruccioli, Valentina Vaninia, Teresa Chiacchio, Daniela M. Cirillo, Fabrizio Palmieri, Giuseppe Ippolito, Delia Goletti

Translational Research Unit, Department of Epidemiology and Preclinical Research, National Institute for Infectious Diseases (INMI) “L. Spallanzani”, Rome, Italy
Emerging Bacterial Pathogens Unit, Division of Immunology and Infectious Diseases IRCCS, San Raffaele Scientific Institute, Milan, Italy
Department of Clinical and Clinical Research, National Institute for Infectious Diseases (INMI), Rome, Italy
Scientific Direction, National Institute for Infectious Diseases (INMI), Rome, Italy

ARTICLE INFO

Article history:
Received 20 September 2016
Accepted 24 September 2016
Available online xxxx

Keywords:
Tuberculosis
QuantiFeron-Plus
Latency
Infection
Diagnosis

ABSTRACT

Objective/Background: Interferon (IFN)-γ-release assays (IGRAs) are designed for the diagnosis of tuberculosis (TB) infection. The new IGRA called QuantiFERON-TB Plus (QFT-Plus) is based on enzyme-linked immunosorbent assay (ELISA) detection of IFN-γ following Mycobacterium tuberculosis-antigen stimulation with TB1 and TB2 antigens. TB1 elicits a cell-mediated immune response by CD4 T cells and TB2 elicits a response from both CD4 and CD8 T cells. Here, we characterized variations IFN-γ release detected by ELISA to QFT-IT and QFT-Plus in patients with active TB and latent TB infection (LTBI) at baseline and during or after specific treatment (follow-up).

Methods: We studied seven patients with active TB and 10 patients with LTBI at baseline and during treatment either for active disease or preventive therapy. IFN-γ release detected by ELISA to QFT-IT and QFT-Plus in patients with active TB and latent TB infection (LTBI) at baseline and during or after specific treatment (follow-up).

Results: All participants responded to the mitogen, with all active-TB patients responding to QFT-IT or QFT-Plus at baseline. The responses did not change over time either qualitatively (number of responders) or quantitatively (IFN-γ release evaluated as IU/mL). Among the LTBI group, although all participants responded to both QFT-IT and QFT-Plus and the responses did not change over time, the quantitative responses to QFT-Plus showed a different trend. Specifically, response to TB2 was significantly lower at follow-up as compared with that observed at baseline (p = 0.004), whereas the response to TB1 was not significantly different (p = 0.16).

http://dx.doi.org/10.1016/j.ijmyco.2016.09.029

* Corresponding author at: INMI Lazzaro Spallanzani, Padiglione Del Vecchio, Via Portuense 292 00149 Rome, Italy.
E-mail address: elisa.petruccioli@inmi.it (E. Petruccioli).

Peer review under responsibility of Asian African Society for Mycobacteriology.

http://dx.doi.org/10.1016/j.ijmyco.2016.09.029
Conclusion: To our knowledge, this is the first report characterizing IFN-γ responses to QFT-Plus antigens in participants with active TB and LTBI over time. The data need to be confirmed in larger settings; however, we showed that monitoring IFN-γ release in response to TB2 can be used to evaluate preventive therapy immune changes. This can be useful also as a tool for public health control strategies in settings where preventive treatment is recommended.

Conflicts of interest

The authors have no conflicts of interest to declare.