Cytokine. 2020 Jan;125:154824. doi: 10.1016/j.cyto.2019.154824. Epub 2019 Aug 28.

Heterogeneity in the cytokine profile of tuberculosis – diabetes co-morbidity

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PMID: 31472402 DOI: 10.1016/j.cyto.2019.154824

Abstract

Tuberculosis - diabetes (TB-DM) co-morbidity is characterized by heterogeneity in clinical and biochemical parameters between newly diagnosed diabetic individuals with TB (TB-NDM) and known diabetic individuals at incident TB (TB-KDM). However, the immunological profile underlying this heterogeneity is not explored. To identify the cytokine profiles in TB-NDM and TB-KDM individuals, we examined the plasma cytokine levels as well as TB-antigen stimulated levels of pro-inflammatory cytokines. TB-KDM individuals exhibit significantly higher levels of IFNγ, IL-2, TNFα, IL-17A, IL-1α, IL-1β and IL-6 in comparison to TB-NDM, TB alone and DM alone individuals. TB-NDM individuals are characterized by significantly lower levels of blood glucose and glycated hemoglobin in comparison to TB-KDM with both groups exhibiting a significant lowering of glycated hemoglobin levels at 6 months of anti-tuberculosis therapy (ATT). TB-NDM individuals are characterized by significantly diminished - unstimulated levels of IFNγ, IL-2, TNFα, IL-17A, IL-1α, IL-1β and IL-12 at pre-treatment, of IFNγ, IL-2 and IL-1α at 2 months of ATT and IL-2 at post-treatment in comparison to TB-KDM. TB-NDM individuals are also characterized by significantly diminished TB-antigen stimulated levels of IFNγ, IL-2, TNFα, IL-17A, IL-17F, IL-1α, IL-1β and/or IL-6 at pre-treatment and at 2 months of ATT and IFNγ, IL-2, IL-1α and IL-1β at post-treatment. In addition, TB-NDM individuals are characterized by significantly diminished mitogen - stimulated levels of IL-17F and IL-6 at pre-treatment and IL-6 alone at 6 months of ATT. Therefore, our data reveal considerable heterogeneity in the immunological underpinnings of TB-DM co-morbidity. Our data also suggest that TB-NDM exhibits a characteristic profile, which is both biochemically and immunologically distinct from TB-KDM.

Keywords: Bacterial; Cytokines; Diabetes mellitus; Tuberculosis.

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