Cell-mediated immunity following immunization with pneumococcal vaccines in post-traumatic splenectomized individuals

Background

Despite the use of the proper pneumococcal vaccines, splenectomy is associated with increased risk of overwhelming post-splenectomy infections (OPSI). Cell-mediated immune response to pneumococcal vaccines, which may also play an important role in pathogenesis of OPSI, has not yet studied in these patients. The present study aims to investigate the levels of vaccination-induced T-cell responses and cytokine levels in asplenic individuals.

Materials & Methods

5 healthy and 14 post-traumatic splenectomized individuals.

Vaccinated with PCV13 and PPV23 according to the guidelines established by CDC (2012).

Collection of blood samples (20 ml) before vaccination, 8 weeks after PCV-13 vaccination (PCV-13) and 4 weeks after PPV-23 vaccination (PCV-13 + PPV-23).

In vitro stimulation of PBMCs with PCV13.

Analysis of vaccine-specific lymphocyte proliferation (CFSE labeling).

Analysis of vaccine-specific T_{H1}, T_{H2} and T_{H17} subsets (Flow cytometer).

Analysis of vaccine-specific IFN-γ, IL-4 and IL-17 (ELISA).

Results

Figure 1: The levels of CD4+ T_{H} cell subsets- T_{H1} (A), T_{H2} (B), and T_{H17} (C) - induced by PCV13 treatment in vitro.

Figure 2: The levels of IFN-γ (A), IL-4 (B), and IL-17 (C) cytokine release induced by PCV13 treatment in vitro.

Figure 3: Level of lymphoproliferation in response to PCV-13 treatment in vitro.

Conclusion

Splenectomy negatively influences the in vitro PCV-induced levels of lymphoproliferation, T_{H1} cells, and cytokine release.

PCV-13 failed to induce T_{H17}-dominant immune response which is crucial for protection against extracellular pathogens.