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Immunotherapy of patients with multiple and extreme drug-resistant pulmonary tuberculosis with autologous monocyte- and stem cell-derived dendritic cells vaccine

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ABSTRACT

Aims and objectives: This study evaluates the response of TB patients to treatment with autologous dendritic cell (DC) vaccine.

Methods: There were 25 patients with MDR\XDR pulmonary TB included in the study. DCs were obtained both from peripheral blood monocytes and bone marrow isolated stem cells using standard protocols. DCs were primed with either autologous M. tuberculosis lysates or CFP-10 peptides and cultured with maturation inducers. DCs were tested for immunophenotype, viability and sterility and injected into the patients subcutaneously three times at 2- to 3-week intervals. Clinical monitoring, sputum assessments, chest X-rays and immune status were performed before and 2–3 months after the treatment. The control group (C) consisted of 25 patients with MDR\XDR TB matched by sex and age.

Results: DCs obtained from all patients were sterile, viable, morphologically intact and phenotypically mature (expression of CD83 and CD86 being >80%). The number of injected DCs averaged 10.2 (range: 8.3–15.6) $\times 10^6$.

Treatment of TB patients with autologous DCs was safe and well tolerated. No significant side effects which required medical aid were noted during the study.

The combination of standard treatment and DC-vaccination promoted the decrease or complete clearance of mycobacteria tuberculosis from the sputum (DC-treated patients – 69.23 ± 12.8% versus 30.76 ± 12.8% in C, $p < 0.05$) and X-ray improvement (69.23 ± 12.8% versus 30.76 ± 12.8% in C, $p < 0.05$).

Treatment with DCs was also associated with the significant increase of antigen-specific T-cells in the blood, which reflects the accumulation of antigen-specific T-cells in peripheral blood and indicates the restoration of immune response against mycobacteria tuberculosis.

Conclusions: DC-based treatment may become an effective valuable method of cellular immunotherapy for MDR- and XDR-TB patients.

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