

Particular characterisation of an in-vitro-DTH test to monitor cellular immunity - applications for patient care and space flight

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Abstract/Summary:

Background: Immune-monitoring using recall antigens in the delayed type hypersensitivity (DTH) skin test served as a valuable tool in humans. With the DTH (Multitest, Mérieux) it was possible to evaluate the extent of immune-modulation under clinical/field conditions but the test was phased out in 2002. We have characterized now an analogous test to monitor these changes by incubating whole blood with bacterial, fungal and viral antigens (*in-vitro* DTH).

Goal: i) Characterization of the role of the main immune reactive cell types contributing to the cellular immune response in the in-vitro DTH and ii) Validation of the in-vitro DTH under different clinical and field conditions.

Methods: As positive control whole blood was incubated in the in-vitro DTH, supernatants were gathered after 12, 24 and 48h. Readout parameters of this test are cytokines in the assay's supernatant. To determine the role of T-cells, monocytes and natural killer (NK), these cell populations were depleted using magnetic beads prior to in-vitro-DTH incubation. Validation of the test has occurred under clinical (HIV-patients, ICU) and field-conditions (parabolic/space-flights, confinement).

Results: T-cell depletion abandoned almost any IL-2 production and reduced IFN- γ production irrespective of the type of antigen, whereas CD56 depleted cultures tended to lower IL-2 secretion and IFN- γ and to parallel a IL-10-increase after viral challenge. This IL-10-increase was seen also in CD14-depleted setups. DTH read-out was significantly different under acute stress (parabolic flight) or chronic stress (ISS), respectively. Preliminary data of HIV infected patients demonstrate that this test can display the contemporary immune status during an antiviral therapy.

Conclusion: The in-vitro DTH mirrors adaptive and innate immune activation and may serve as tool also for longitudinal follow up of Th1/Th2 weighed immune response under adverse life conditions on earth and in space. It is planned to implement the assay in the on the ISS (MoCISS).

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