In vitro diagnosis of contact allergy to nickel: The value of the ELISpot assay

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Background: Diagnosis of contact allergy is based on clinical data and patch tests. Among in vitro tests, lymphocyte proliferation test (LPT) is most frequently used. A disadvantage of LPT is that it is based on radiochemicals, which restricts its use only to laboratories with radionuclide facilities.

Objective: To find a cytokine secretion assay giving results that correlate best with clinical diagnosis and with LPT.

Methods: PBMC from 14 patients with ACD to nickel and 14 non-allergic controls were tested for their reactivity to nickel. In all subjects, patch tests and LPT with nickel sulphate were done. A range of non-radioactive secretion assays was performed, including ELISpot assays for IL-2, IL-5, IL-13 and IFN-γ, and ELISA for IL-5 and IFN-γ. Beside standard culture conditions, cytokine secretion was also measured in cultures favouring the development of Tc1/Th1 or Tc2/Th2 lymphocytes (“skewing” through addition of IL-7 with respectively IL-12 or IL-4).

Results: The best correlation with clinical diagnosis (patch tests and history) was observed for IL-13 ELISpot with Tc2/Th2 skewing (r=0.654, P<0.001), followed by LPT (r=0.612, P<0.001), and IL-5 ELISpot with Tc2/Th2 skewing (r=0.551, P=0.002). The non-radioactive method that correlated best with LPT was IL-2 ELISpot (r=0.809, P<0.001), followed by IL-13 ELISpot (r=0.778, P<0.001), and IL-5 ELISA (r=0.669, P<0.001). Interestingly, IFN-γ ELISpot and IFN-γ ELISA correlated very poorly with both clinical diagnosis and LPT results (r<0.010 in each case).

Conclusions: Results of IL-13 ELISpot with Tc2/Th2 skewing correlate best with clinical diagnosis of contact allergy to nickel, whereas IL-2 ELISpot seems a good non-radioactive alternative for lymphocyte proliferation test.

IN VITRO DIAGNOSIS OF CONTACT ALLERGY TO NICKEL: THE VALUE OF THE ELISPOT ASSAY
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BACKGROUND
Diagnosis of contact allergy is based on clinical data and patch tests. Among in vitro tests, lymphocyte proliferation test (LPT) is most frequently used. A disadvantage of the LPT is that it is based on radiochemicals.

OBJECTIVE
To find a cytokine secretion assay giving results that correlate best with clinical diagnosis and with LPT.

METHODS
Patch tests with nickel
- LPT with nickel
- ELISpot assays for IL-2, IL-5, IL-13 and IFN-gamma
- ELISA for IL-5 and IFN-gamma

PBMC cultures
- standard conditions
- stimulation of Tc1/Th1 development (addition of IL-7 and IL-12)
- stimulation of Tc2/Th2 development (addition of IL-7 and IL-4)

RESULTS
Best correlates with clinical diagnosis (patch tests and history):
- IL-13 ELISpot with Tc2/Th2 skewing (r=0.654, P<0.001)
- LPT (r=0.612, P<0.001)
- IL-5 ELISpot with Tc2/Th2 skewing (r=0.551, P=0.002)

Best non-radioactive correlates with LPT
- IL-2 ELISpot (r=0.809, P<0.001)
- IL-13 ELISpot (r=0.778, P<0.001)
- IL-5 ELISA (r=0.669, P<0.001)

IFN-gamma ELISpot and ELISA correlated very poorly with both clinical diagnosis and LPT results (r<0.01 in each case).

CONCLUSIONS
IL-13 ELISpot with Tc2/Th2 skewing correlates best with clinical diagnosis of nickel allergy.

IL-2 ELISpot seems best non-radioactive alternative for lymphocyte proliferation test.

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