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## Hypereosinophilia induced by high-dose intratumoral and peritumoral mistletoe application to a patient with pancreatic carcinoma.

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A patient with inoperable adenocarcinoma of the pancreas was treated with intraperitumoral and peritumoral injections of a *Viscum album L.* extract containing 5,700 ng/mL mistletoe lectin, mainly mistletoe lectin 1 (*Abnobaviscum Quercus 2*) for 5 weeks (1 injection per week). After the third injection (day 22), a marked eosinophilia was observed (1,800 per microliter) that rose to 3,268 per microliter after the fifth injection (day 42). Furthermore, histology performed on day 28 revealed accumulation of eosinophils in ductal lesions and adjacent stroma in addition to the features of ductal adenocarcinoma. In order to investigate whether eosinophilia correlated with immunological features, we analyzed cytokine production of peripheral blood mononuclear cells (PBMC) from this patient after stimulation with antigens known to "unmask" an individual's predisposition for defined immunoreactions, namely purified protein derivative (PPD) as a stimulator of T-helper (TH1)1-cells and tetanus toxoid (TT) as an activator of TH2-cells. PBMC of the patient showed a strong proliferation and production of interleukin (IL)-5 and IL-10 after incubation with TT indicating a type-2 response. Simultaneously, PBMC were induced to proliferate and produce interferon gamma (IFN-gamma) by incubation with PPD suggesting also a type-1 response. These data would readily explain the eosinophilia because eosinophils are effector cells of type-2 reaction but also require type-1 cytokines. Although the overall clinical course of the patient was rapidly progressive, temporary stabilization of the patient's general condition during mistletoe treatment was observed. It is, however, still an open question whether this transient benefit was due to the induction of eosinophilia by a type-2 response. **CONCLUSION:** Before high-dose intratumoral and peritumoral treatment with a *Viscum album L.* extract containing mistletoe, lectin 1 can be associated with hypereosinophilia and strong production of TH1 as TH2 cytokines as well.

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