**Supplementary information**

**Methods**

Immunofluorescence staining was performed on 4 – 5 µm thick formaldehyde-fixed and paraffin-embedded skin biopsies from atopic dermatitis patients (lesional n=13, non-lesional n=5) and healthy individuals (n=3).

Sections were deparaffinized and rehydrated with decreasing ethanol dilutions. After antigen retrieval in 1 mM EDTA / 10 mM Tris buffer pH 9.0 (CD3 staining) or 10 mM Tri-sodium-citrate buffer pH 6.0 (all other stainings), slides were incubated for one hour in a blocking solution composed of 25% normal donkey serum (CD3, MCT, vimentin, CD1a stainings) or 25% normal rabbit serum (CD11b, ECP), 25% human polyvalent IgG, 25% BSA, 25% PBS, 1% ChromPure human IgG. For the CD68 staining the, solution was composed of 20% normal donkey serum, 20% normal rabbit serum, 20% human polyvalent IgG, 20% BSA, 20% PBS, and 1% ChromPure human IgG. Sections were then incubated overnight at 4°C with antibodies directed against IL-15 (R&D Systems, Minneapolis, MN, USA), ECP (Pharmacia & Upjohn, Uppsala, Sweden), vimentin (Cell Signaling Technology, Danvers, MA), MCT, CD1a, CD3, CD68 (all from Dako, Glostrup, Denmark) and CD11b (Santa Cruz Biotechnology, Dallas, TX, USA). Subsequently, specimens were treated with corresponding secondary antibodies labeled with Alexa Fluor 488 (Life Technologies, Eugene, OR, USA and Jackson ImmunoResearch, West Grove, PA, USA), Alexa Fluor 555 (Life Technologies, Eugene, OR, USA), Cy3 or TRITC (both from Jackson ImmunoResearch, West Grove, PA, USA) for one hour. DNA was thereafter demonstrated with Hoechst stain (Molecular Probes, Eugene, OR, USA). Lastly, samples were mounted in Dako fluorescent mounting medium (Dako, Carpinteria, CA, USA). Control slides were treated similarly while omitting the primary antibodies.

The analysis of the skin sections was performed using a confocal laser scanning microscope (LSM510, Carl Zeiss, Jena, Germany) and a digital slide scanner (slide scanner Panoramic Midi, 3Dhistech, Budapest, Hungary). Cells were counted in ten 146 μm x 146 μm juxtaposed fields per specimen in the dermis. CD1a+ cells were counted in the epidermis. Dermal DC were identified with morphological criteria (spindle shaped cells) in addition to CD11b and vimentin positivity. IL-15 expression in the epidermis was quantified in 5 representative images per biopsy with the software Imaris (Bitplane, Zurich, Switzerland). To this end, the percentage of the epidermis that was IL-15 positive, was analyzed whereby DC, morphologically recognizable by their morphology and high IL-15 positivity, were excluded.

The statistical analysis was performed using the software GraphPad Prism 7 (La Jolla, CA, USA). Mean values ± SEM are provided. To compare the three groups (AD, non lesional AD and normal skin), the one-way ANOVA and Tukey’s multiple comparisons tests were applied. P-values ≤0,05 were considered statistically significant.