**Tabel S1.** Overview of cytokines investigated in the study.

|  |  |
| --- | --- |
| Biopsy/mRNA | Tape/protein |
| IFN-γ  IL-1β  IL-5  IL-10  IL-13  IL-31  IL-33  TSLP  IL-4Rα | IFN-γ  IL-1β  IL-5  IL-10  IL-13  IL-2  IL-4  IL-8  IL-12p70  TNF-α |

**Table S2.** Cytokines mRNA levels and protein levels.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cytokine | Location | Sample | n | Median; 95% confidence interval | Atopic skin compared with healthy control skin, Mann Whitney, P | Treated atopic skin compared with untreated skin, Wilcoxon-signed rank test, P |
| IFN-γ | Luntreated | Biopsy, mRNA | 12 | 8.53\*106; 5.6\*10-6-2.5\*10-5 | 0.0011\* |  |
|  |  | Tape, protein | 12 | 0.120; 0.0107-0.561 | 0.22 |  |
|  | Ltreated | Biopsy, mRNA | 6 | 0.0; -5.73\*10-7-2.40\*10-6 | 0.57 | 0.063 |
|  |  | Tape, protein | 6 | 0.0; -0.0380-0.159 | > 0.99 | 0.44 |
|  | NLuntreated | Biopsy, mRNA | 12 | 8.48\*10-7; 8.0\*10-8-3.28\*10-6 | 0.36 |  |
|  |  | Tape, protein | 12 | 0.0; 0.00439-0.190 | 0.47 |  |
|  | NLtreated | Biopsy, mRNA | 6 | 3.59\*10-6; -1.17\*10-6-1.19\*10-5 | 0.21 |  |
|  |  | Tape, protein | 6 | 0.0; -0.0678-0.154 | 0.11 |  |
|  | C | Biopsy, mRNA | 6 | 0.0; -8.3’10-7-2.7\*10-6 | - |  |
|  |  | Tape, protein | 6 | 0.0845; 0.0225-0.141 | - |  |
| IL-1β | Luntreated | Biopsy, mRNA | 12 | 0.000712; 0.000450-0.00263; | 0.14 |  |
|  |  | Tape, protein | 12 | 0.131; -0.495-2.50 | 0.0020\* |  |
|  | Ltreated | Biopsy, mRNA | 6 | 0.000201; 0.000108-0.000284 | 0.79 | 0.063 |
|  |  | Tape, protein | 6 | 0.0740; 0.0276-0.148 | 0.063 | 0.69 |
|  | NLuntreated | Biopsy, mRNA | 12 | 0.000253; 0.000132-0.000689 | 0.17 |  |
|  |  | Tape, protein | 12 | 0.1050; 0.0471-0.451 | 0.0032\* |  |
|  | NLtreated | Biopsy, mRNA | 6 | 0.000205; 7.73\*10-5- 0.000372 | 0.57 |  |
|  |  | Tape, protein | 6 | 0.0570; -0.342-1.03 | 0.13 |  |
|  | C | Biopsy, mRNA | 6 | 0.000172; 8.37\*10-5-8.37\*10-5 | - |  |
|  |  | Tape, protein | 6 | 0.019; 0.00264-0.0694 | - |  |
| IL-5 | Luntreated | Biopsy, mRNA | 12 | 8.03\*10-7; 4.26\*10-8-6.38\*10-6 | 0.04\* |  |
|  |  | Tape, protein | 12 | 0.0; -0.000827-0.0143 | 0.41 |  |
|  | Ltreated | Biopsy, mRNA | 6 | 0.0; 0.0-0.0 | > 0.99 | 0.13 |
|  |  | Tape, protein | 6 | 0.0; 0.0-0.0 | > 0.99 | 0.25 |
|  | NLuntreated | Biopsy, mRNA | 12 | 0.0; -2.25\*10-6- 7.38\*10-6 | 0.44 |  |
|  |  | Tape, protein | 12 | 0.0; -0.00320-0.00854 | > 0.99 |  |
|  | NLtreated | Biopsy, mRNA | 6 | 0.0; -4.61\*10-7-1.86\*10-6 | 0.45 |  |
|  |  | Tape, protein | 6 | 0.0; 0.0-0.0 | > 0.99 |  |
|  | C | Biopsy, mRNA | 6 | 0.0; 0.0-0.0 | - |  |
|  |  | Tape, protein | 6 | 0.0 | - |  |
| IL-10 | Luntreated | Biopsy, mRNA | 12 | 0.000577; 0.000277-0.00130 | 0.0004\* |  |
|  |  | Tape, protein | 12 | 0.0015; -0.00147-0.0186 | 0.086 |  |
|  | Ltreated | Biopsy, mRNA | 6 | 0.000329; 0.000208- 0.000515 | 0.0022\* | 0.16 |
|  |  | Tape, protein | 6 | 0.0; 0.0-0.0 | > 0.99 | 0.50 |
|  | NLuntreated | Biopsy, mRNA | 12 | 0.000122; 1.66\*10-5- 0.000629 | 0.25 |  |
|  |  | Tape, protein | 12 | 0.0; 5.08\*10-7-0.00667 | 0.25 |  |
|  | NLtreated | Biopsy, mRNA | 6 | 0.000279; 0.000129- 0.000482 | 0.0087\* |  |
|  |  | Tape, protein | 6 | 0.0; 0.0-0.0 | > 0.99 |  |
|  | C | Biopsy, mRNA | 6 | 6.42\*10-5; 1.23\*10-5-0.000136 | - |  |
|  |  | Tape, protein | 6 | 0.0; 0.0-0.0 | - |  |
| IL-13 | Luntreated | Biopsy, mRNA | 12 | 0.000725; 0.000530-0.00128 | 0.0001\* |  |
|  |  | Tape, protein | 12 | 0.0; -0.00386-0.378 | 0.130 |  |
|  | Ltreated | Biopsy, mRNA | 6 | 3.32\*10-5; -6.26\*10-5-0.000270 | 0.15 | 0.031 |
|  |  | Tape, protein | 6 | 0.0; 0.0-0.0; | > 0.99 | 0.25 |
|  | NLuntreated | Biopsy, mRNA | 12 | 3.86\*10-5; -2.53\*10-5-0.000230 | 0.066 |  |
|  |  | Tape, protein | 12 | 0.0; 0.0-0.0 | > 0.99 |  |
|  | NLtreated | Biopsy, mRNA | 6 | 5.17\*10-5; 1.04\*10-5-1.04\*10-5 | 0.18 |  |
|  |  | Tape, protein | 6 | 0.0; 0.0-0.0 | > 0.99 |  |
|  | C | Biopsy, mRNA | 6 | 0.0; -1.32\*10-5--1.32\*10-5 | - |  |
|  |  | Tape, protein | 6 | 0.0;0.0-0.0 | - |  |
| IL-31 | Biopsy, mRNA | |  |  |  |  |
|  | Luntreated | | 12 | 6.34\*10-7; -4.22\*10-6-2.803\*10-5 | 0.28 |  |
|  | Ltreated | | 6 | 0.0; 0.0.-0.0 | > 0.99 | 0.25 |
|  | NLuntreated | | 12 | 0.0; 0.0-0.0 | 0.33 |  |
|  | NLtreated | | 6 | 0.0; 0.0-0.0 | > 0.99 |  |
|  | C | | 6 | 0.0; -2.17\*10-6-4.93\*10-6 | - |  |
| IL-33 | Biopsy, mRNA | |  |  |  |  |
|  | Luntreated | | 12 | 0.0125; 0.0101-0.0299 | 0.099 |  |
|  | Ltreated | | 6 | 0.0203; 0.0101-0.0271 | 0.041\* | > 0.99 |
|  | NLuntreated | | 12 | 0.0118; 0.0117-0.0117 | 0.065 |  |
|  | NLtreated | | 6 | 0.0281; 0.0100-0.0395 | 0.065 |  |
|  | C | | 6 | 0.00849; 0.00374-0.0183 | - |  |
| TSLP | Biopsy, mRNA | |  |  |  |  |
|  | Luntreated | | 12 | 0.000563; 0.000317-0.00125 | 0.47 |  |
|  | Ltreated | | 6 | 0.000670; 0.000429-0.000853 | 0.18 | 0.31 |
|  | NLuntreated | | 12 | 0.000416; 0.000274-0.000555 | 0.449 |  |
|  | NLtreated | | 6 | 0.000483; 0.000352-0.000600 | 0.90 |  |
|  | C | | 6 | 0.000508; 0.000361-0.000608 | - |  |
| IL-4R | Biopsy, mRNA | |  |  |  |  |
|  | Luntreated | | 12 | 0.0271; 0.0206-0.0366 | -0.0001\* |  |
|  | Ltreated | | 6 | 0.0; 0.00696-0.0168 | 0.45 | 0.031 |
|  | NLuntreated | | 12 | 0.00819; 0.00616-0.0117 | 0.052 |  |
|  | NLtreated | | 6 | 0.00848; 0.00569-0.0143 | 0.0022\* |  |
|  | C | | 6 | 0.00536;0.00398-0.00607 | - |  |
| IL-2 | Tape, protein | |  |  |  |  |
|  | Luntreated | | 12 | 0.0; -0.00382-0.0297 | 0.25 |  |
|  | Ltreated | | 6 | 0.0; 0.0-0.0 | > 0.99 | 0.13 |
|  | NLuntreated | | 12 | 0.0; 0.0-0.0 | > 0.99 |  |
|  | NLtreated | | 6 | 0.0; 0.0-0.0 | > 0.99 |  |
|  | C | | 6 | 0.0;0.0-0.0 | - |  |
| IL-4 | Tape, protein | |  |  |  |  |
|  | Luntreated | | 12 | 0.0290; -0.0262-0.269 | 0.0013\* |  |
|  | Ltreated | | 6 | 0.0124; -0.00616-0.0238 | 0.0022\* | 0.31 |
|  | NLuntreated | | 12 | 0.0; -0.000974-0.0151 | 0.34 |  |
|  | NLtreated | | 6 | 0.0; -0.00419-0.00952 | > 0.99 |  |
|  | C | | 6 | 0.0; -0.00209-0.00476 | - |  |
| IL-8 | Tape, protein | |  |  |  |  |
|  | Luntreated | | 12 | 0.764; -1.86-11.9 | 0.0001\* |  |
|  | Ltreated | | 6 | 0.0160; -0.142-0.590 | 0.0043\* | 0.22 |
|  | NLuntreated | | 12 | 0.0310; -0.0664-0.437 | 0.0045\* |  |
|  | NLtreated | | 6 | 0.0305; -0.00563-0.0860 | 0.0065\* |  |
|  | C | | 6 | 0.0065; 0.00232-0.00835 | - |  |
| IL-12 | Tape, protein | |  |  |  |  |
|  | Luntreated | | 12 | 0.0; -0.00120-0.0173 | 0.12 |  |
|  | L treated | | 6 | 0.0; -0.00844-0.0351 | 0.48 | > 0.99 |
|  | NLuntreated | | 12 | 0.0; 0.0-0.0 | 0.0007\* |  |
|  | NLtreated | | 6 | 0.0; -0.00567-0.0230 | 0.52 |  |
|  | C | | 6 | 0.0170; 0.00361-0.0231 | - |  |
| TNF-α | Tape, protein | |  |  |  |  |
|  | Luntreated | | 12 | 0.0110; 0.00270-0.0528 | 0.16 |  |
|  | Ltreated | | 6 | 0.0150; 0.00574-0.0223 | 0.097 | 0.69 |
|  | NLuntreated | | 12 | 0.0; 4.95\*10-5-0.0148 | 0.47 |  |
|  | NLtreated | | 6 | 0.00750; -0.00164-0.0200 | 0.83 |  |
|  | C | | 6 | 0.00750; 0.00233-0.0127 | - |  |

**Table S3.** Detection rates. For tape strips, % of samples with cytokines above lower limit of detection are shown. For biopsies, % of samples with Ct<40 are shown.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IFN-γ | IL-1β | IL5 | IL10 | IL13 | IL31 | IL33 | TSLP | IL4R | IL2 | IL4 | IL8 | IL12 | TNF -α |
| BIOPSY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| preNL | 67 | 100 | 25 | 83 | 67 | 0 | 100 | 92 | 100 | - | - | - | - | - |
| postNL | 67 | 100 | 33 | 100 | 50 | 0 | 100 | 100 | 100 | - | - | - | - | - |
| preL | 100 | 100 | 58 | 100 | 100 | 50 | 100 | 100 | 100 | - | - | - | - | - |
| postL | 33 | 100 | 0 | 100 | 67 | 0 | 100 | 100 | 100 | - | - | - | - | - |
| C | 33 | 100 | 0 | 83 | 17 | 17 | 100 | 100 | 100 | - | - | - | - | - |
| Average | 60 | 100 | 23 | 93 | 60 | 13 | 100 | 98 | 100 |  |  |  |  |  |
| TAPE |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| preNL | 33 | 100 | 8 | 33 | 0 | - | - | - | - | 0 | 33 | 92 | 0 | 33 |
| postNL | 17 | 100 | 0 | 0 | 0 | - | - | - | - | 0 | 17 | 100 | 33 | 50 |
| preL | 97 | 100 | 33 | 50 | 42 | - | - | - | - | 42 | 92 | 100 | 33 | 92 |
| postL | 33 | 100 | 0 | 0 | 0 | - | - | - | - | 0 | 33 | 100 | 33 | 83 |
| C | 83 | 100 | 17 | 0 | 0 | - | - | - | - | 0 | 17 | 100 | 83 | 83 |
| Average | 52 | 100 | 12 | 17 | 8 |  |  |  |  | 8 | 38 | 98 | 37 | 68 |