**Legends for Supplementary Figures**

**Supplementary Figure 1.** Treatment with CpG causes a reduction of Treg within the CD4 T cell population and an increase of CD8+ tumor-infiltrating cells. **(a)** The CT26 tumors described in Figure 1b were stained for CD4 and infiltrating cells were counted by fluorescence microscopy. The FoxP3/CD4 ratio was determined. **(b)** The proportion of FoxP3+ cells within tumor-infiltrating CD3+CD4+ T cells was determined by flow cytometry. (**c**) Mice bearing CT26 tumors with an average size of 60 mm2 were treated peritumorally with a single dose of 100µg CpG and the number of FoxP3+ and CD8+ cells per mg tumor tissue, the percentage of FoxP3+ cells within CD3+ cells and the CD8/FoxP3 ratio were determined by flow cytometry four and eight days after CpG treatment. Data are presented as in Figure 1c. *P* values were calculated relative to untreated mice (\*p < 0.05; \*\*p < 0.01; ns, not significant).

**Supplementary Figure 2.** CpG-induced suppression of Treg infiltration in different mouse tumor models. Subcutaneous B16 or EG-7 tumors were induced in C57BL/6 mice. **(a)** Mice bearingB16 tumors (average size 60 mm2) were treated twice at a two-day interval with CpG (n = 7) or remained untreated (n = 7). Two days after the last injection of CpG, tumor-infiltrating FoxP3+ and CD3+ cells were stained on frozen tissue sections and counted in each sample. Data are presented as in Figure 1. **(b)** EG-7 tumor-bearing mice (average tumor size 60 mm2) were treated three times with CpG at two-days intervals (n = 5) or remained untreated (n = 5). Infiltrating T cells were analyzed as in (a). No evaluation of CD3 was performed in the EG-7 model because of CD3 auto-expression by the tumor cells. Error bars indicate SEM. *P* values were calculated relative to untreated mice (\*p < 0.05; \*\*\*p < 0.001).

**Supplementary Figure 3.** Correlation (corr) of intratumoral FoxP3+ cells and CCL22 levels in CT26 tumors from untreated mice (same mice as in Figure 1b and d). CT26 tumors were implanted as described in Fig. 1 and analyzed for infiltration by FoxP3+ cells and intratumoral CCL22. Each data point represents one tumor sample of one individual mouse. Correlation was calculated using Pearson’s correlation coefficient.

**Supplementary Figure 4.** Inducible secretion of CCL22 by CT26-CCL22dox cells. **(a)** One day after the addition of 2 µg/ml doxycycline to the supernatant of cultured CT26-CCL22dox tumor cells, CCL22 induction was measured in the supernatant by ELISA. **(b)** BALB/c mice were inoculated with subcutaneous CT26-CCL22dox tumors and fed with a normal (n = 7) or doxycycline-containing (n = 7) diet. 30 days after tumor inoculation, CT26-CCL22dox tumors were collected and CCL22 levels in the homogenates were measured via ELISA. The proportion of infiltrating CD4+FoxP3+ cells was determined by flow cytometry. Error bars indicate SEM. *P* values were calculated relative to untreated cells or mice, respectively (\*p < 0.05; \*\*p < 0.01).

**Supplementary Figure 5.** CCL22 secretion of human tumor cell lines upon IFN-γ stimulation. Different human tumor cell lines were cultured for three days either untreated or treated with IFN-γ. CCL22 levels in the supernatants were determined by ELISA. Error bars indicate SEM. *P* values were calculated relative to untreated cells (\*p <0.05; \*\*p < 0.01).

**Supplementary Figure 6.**  Type I interferon is a key mediator in the process of CCL22 suppression and tumor regression. (**a**) Sucutaneous B16 tumors were induced in C57BL/6 (n=10) or type I interferon receptor-deficient (IFNAR) mice (n=10). At day 12 after tumor induction, mice of both groups were either treated with 250µg poly(I:C) or remained untreated (n = 6 per group). Tumor size was measured every second day and expressed as mm2. (**b**) CT26 or Panc02 tumor-bearing mice were injected with 3 x 105 U IFN-α or PBS. Four days after treatment intratumoral FoxP3+ cell numbers and CCL22 protein expression was analyzed by flow cytometry and ELISA respectively. Error bars indicate SEM. P values of poly (I:C)-treated mice were calculated to the corresponding untreated animals (\*\*p < 0.01; ns, not significant).

**Supplementary Figure 7.** Efficacy of anti-tumor treatment with CpG is dependent on an CD8+ T cell response. (**a**) Mice with CpG-mediated complete tumor regression were re-challenged with a lethal dose of CT26 (0.25 x 106) and tumor growth was measured every second day. Tumor growth was compared to mice without previous tumor encounter injected with the same amount of CT26 cells. (**b**) Intratumoral CD8+ T cells were isolated from CpG- or PBS-treated CT26 tumor-bearing mice 4 days after treatment. Cells were incubated *ex vivo* for 4h with AH1 peptide and intracellular IFN-γ expression was measured by flow cytometry. Error bars indicate SEM. *P* value was calculated relative to cells isolated from untreated mice (\*p < 0.05)