**Supplementary Figure Legends**

**Supplementary Figure 1. Characterization of canine mesenchymal stem cells and their susceptibility to canine adenoviral infection and replication.** **(a)** Cell surface markers expression were analyzed by flow cytometry. Empty histograms: isotype controls; grey histograms, marker expression. **(b)** Representative images of cells from six different cell donors showing positive adipogenic (upper), osteogenic (middle) and chondrogenic (lower) dMSC differentiation. Scale bar: 50µm (adipogenic and osteogenic) and 200 µm (chondrogenic). **(c)** dMSC were infected with ICOCAV17 and, after 24h, were immunostained for adenovirus detection. Percentage of positive cells are shown. Bars show the mean of positive cells. **(d)** Comparative cytotoxicity of canine CAV2 and CAVRGD viruses replicating in dMSCs. Data from 8 days after infection are shown. Mean ± SD are plotted (n=3). **(e)** Viral production after CAV2 and CAVRGD infection of dMSC.

**Supplementary Figure 2.** **Clinical and anatomo-pathological results in canine patients treated with dCelyvir.** **(a)** X-ray images from UAX-23 patient showing clinical responses on a lung metastasis. Arrow shows metastasis. **(b)** Hematoxilin-Eosin staining and immunohistochemistry on tumor biopsies. Scale bar: 200 µm (HE), 100 µm (immunohistochemistry). Representative images from 20 cases analyzed. **(c)** Semiquantitative evaluation by anatomopathologists of intratumoral immune cells infiltration. Barr represent mean + SEM. Arbitrary units were assigned by anatomopathologists: 0 absence, 1 presence, 2 medium and 3 abundant. Paired T-test was performed (n=20) without significant differences. **(d)** Representative images show MAC387+ cells extravasation from blood vessel to tumor after dCelyvir treatment. Scale bar: 100 µm (left), 50 µm (middle), and 25 µm (right).

**Supplementary Figure 3. Hyaluronic acid detection on canine biopsies**. Hyaluronan Acid Binding Protein (HABP) was used for Hyaluronic acid detection. Representative images of different areas of biopsies pre and post-treatment are shown. Scale bar: 50µm.

**Supplementary Figure 4.** **Flow cytometry gating strategy of immune subpopulation analysis in dog-derived peripheral blood. (a)** Strategy of T lymphocytes gating: CD4+ and CD8+ cellsanalysis fromCD3+SSClow subpopulation. **(b)** Strategy of macrophages gating: CD14+MHCII+ cells **(c)** Strategy of neutrophils gating as CD4+CD3- cells (C1) and T regs as CD3+CD25+CD4+ cells (C2). **(d)** Strategy of natural killers gating as CD5low cells.

**Supplementary Figure 5.** **Hematological and biochemical analysis in canine patients during dCelyvir treatment. (a)** Biochemical profiles in treated dogs. The graphs show the mean at each time point. No significant differences were observed between responders and no responders groups, only in ALT concentration values seems to exhibited relative different kinetics (n=30). Dotted lines indicate normal values in canine specie. **(b)** Concentration of peripheral blood leukocytes in canine patient during treatment. The graph shows the mean ± SEM (n=30).

**Supplementary Table 1.** **List of used antibodies**.

**Supplementary table 2. Canine quality of life evaluation.** Evaluation of patient´s quality of life after the fourth doses of dCelyvir. Percentages of canine patients with good or bad quality of life (threshold at 35).