This manuscript contains supplemental material:

Supplementary Figure 1: Illustration of pHPL production. (**a**) To prepare platelet concentrates from whole blood donations, four units of blood group (BG) O and one unit of BG AB whole blood donations should be separated into plasma, buffy coat (BF), and red blood cells by centrifugation. (**b**) One unit of platelet concentrate is generated by combining four buffy coat units, (all BG O) and one BG AB plasma. The combined product should be centrifuged again to separate leukocytes, which will thereafter be depleted through inline-filtration (as described in more detail in BOX1). These steps should be repeated until 10 units are collected. (**c**) Platelets within the concentrates are lysed by freezing and thawing, and the resulting human platelet lysates (HPL) are pooled to generate 2 – 3 liters of pooled HPL. After aliquoting into smaller storage bags, a second freeze/thaw cycle and one additional centrifugation step should be performed to guarantee maximal lysis and depletion of platelet fragments. The resulting product can be stored in 50mL tubes, ready to use for media preparation.

Supplementary Figure 2: Gating strategy to identify BM-MNCs and BM-MSC. (**a**) Flow-cytometric contour plot showing gating of mononuclear cells (MNCs, red box) within total nucleated cells (TNC, black box). Cell size (FSC-A, x-axis) and cellular granularity (SSC-A, y-axis) allow for the discrimination of lymphocytes (red), monocytes (green) and granulocytes (blue) as illustrated in (**b**). MNCs are comprised of lymphocytes and monocytes whereas TNCs additionally include granulocytes. (**c**) Left plot: Mesenchymal stromal cells (MSCs) are gated (black box) based on cell size (FSC-A, x-axis) and cellular granularity (SSC-A, y-axis) and can be clearly separate from contaminating debris (lower left). Right plot: Live cells (black box) are defined by

absence of 7-aminoactinomycin D (7-AAD) staining. Arrow indicates that only cells defined by gate in FSC-A versus SSC-A plot are analyzed for 7-AAD.

Supplementary Video 1: BM-MSC transplantation.

Movie demonstrating preparation of the mouse (shaving and skin disinfection) and subsequent injection of BM-MSC admixed with extracellular matrix into subcutaneous mouse tissue at four different locations. After the procedure the mouse is placed underneath a warm light source to guarantee quick recovery from anesthesia.

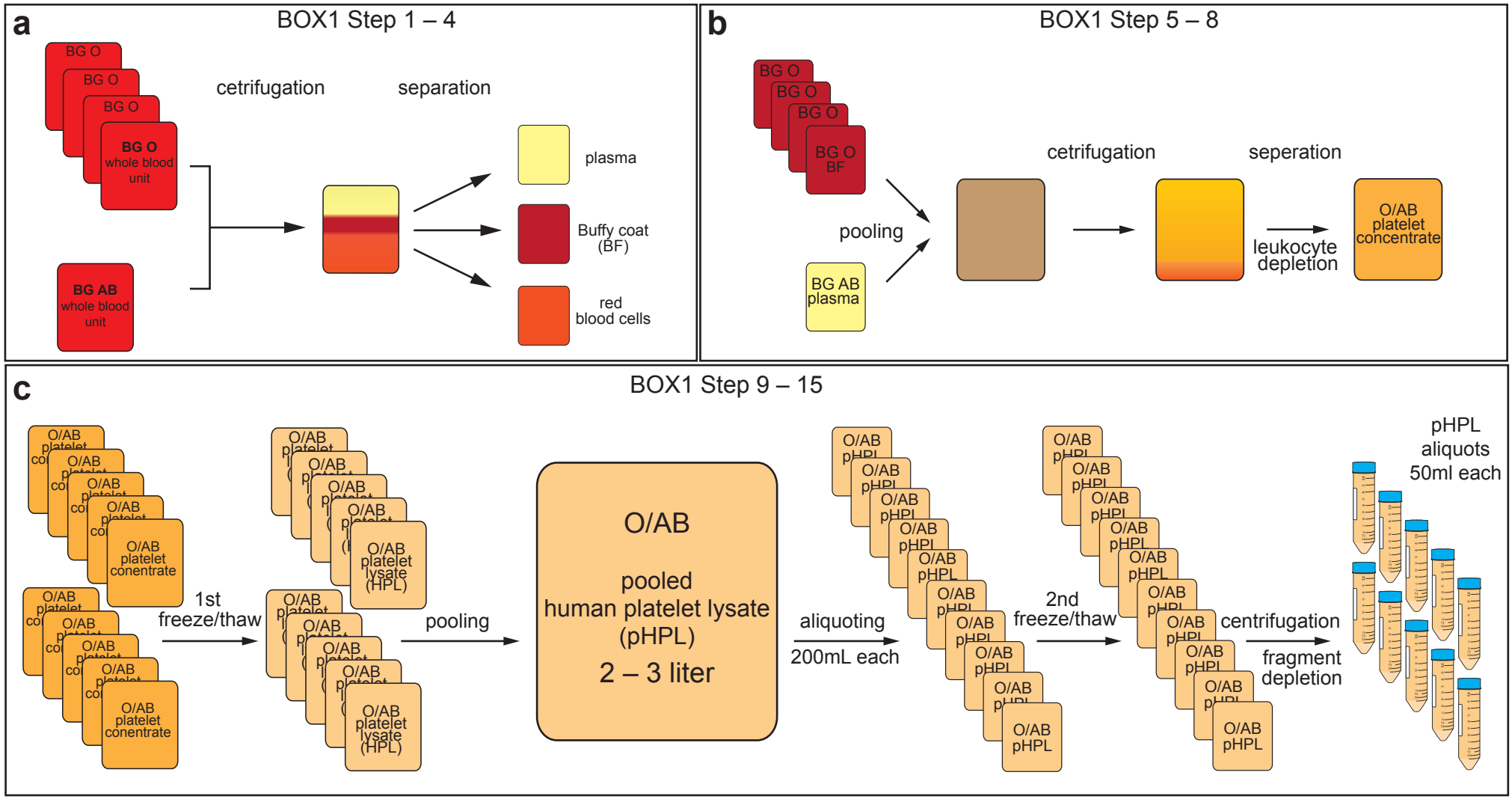
Supplementary Video 2: Ossicle BM transplantation

Movie showing direct intra-ossicle transplantation of human hematopoietic cells.

Supplementary Video 3: Ossicle BM aspiration

Movie demonstrating aspiration of hematopoietic cells directly from a humanized BM-ossicle niche.

Supplementary Figure 1



Supplementary Figure 2