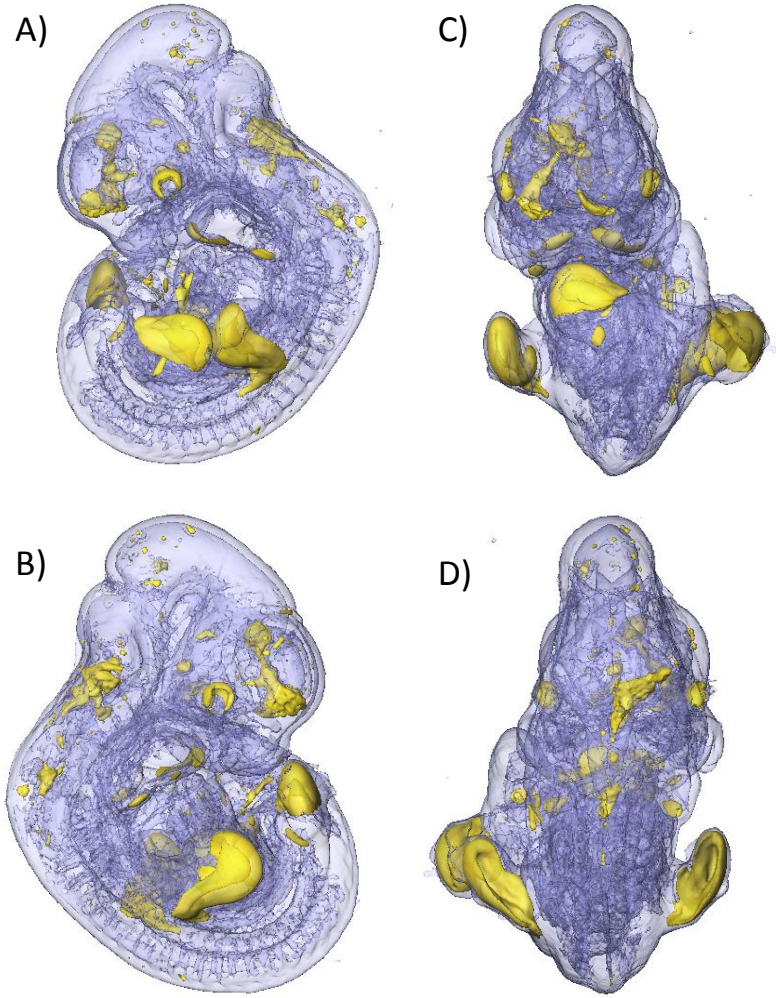

Fig. 1. OPT scan of an embryo at embryonic day E11.5 after performing a whole-mount in-situ hybridization (WISH) labeling for visualizing the gene expression domain of Dusp6. The embryo surface is transparent to allow 3D visualization of the WISH staining (yellow), which shows that Dusp6 is mainly expressed in the forelimbs and hindlimbs. The same embryo is visualized from four different views: A) Left; B) Right; C) Anterior and D) posterior.

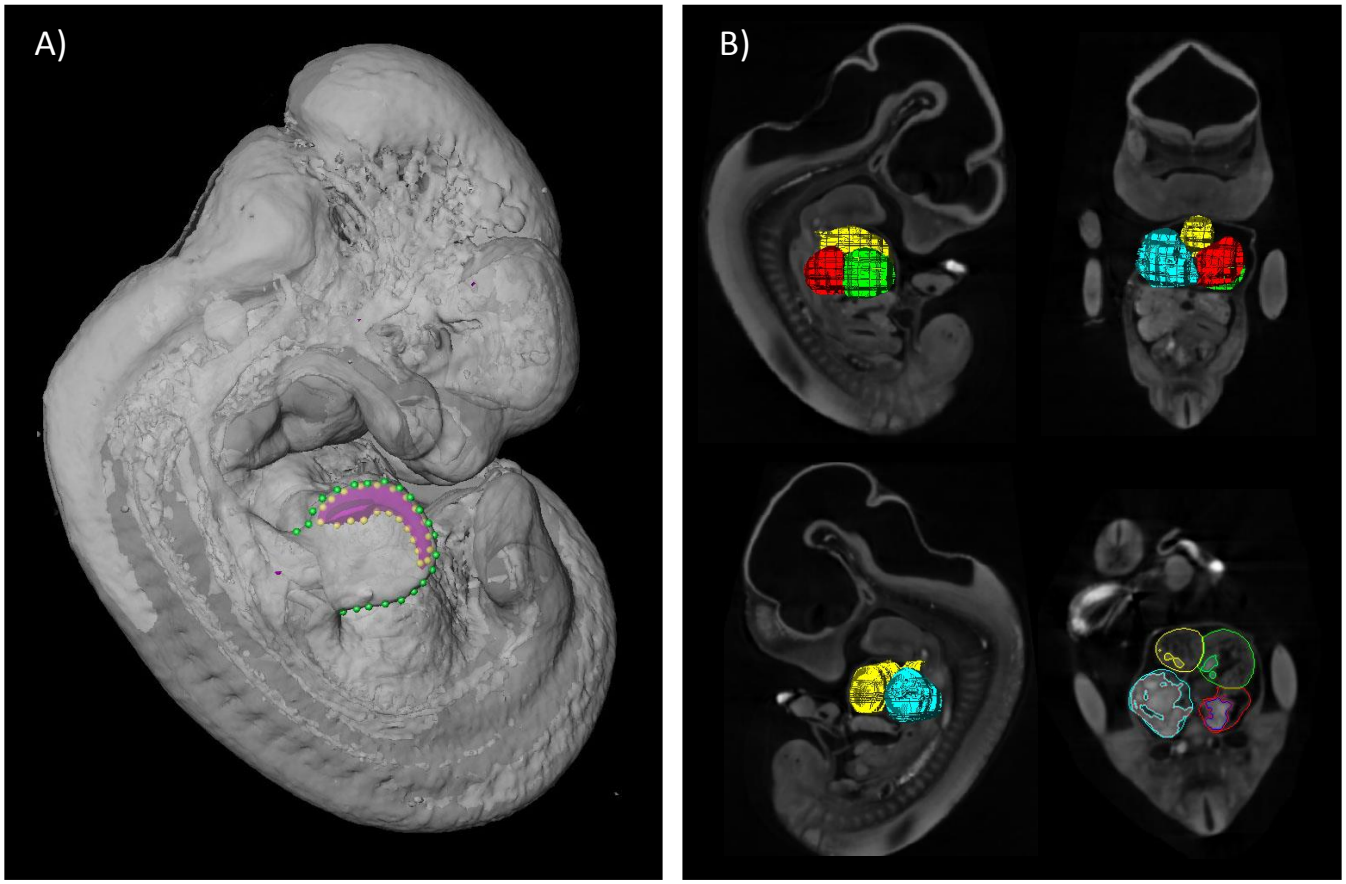

Fig. 2. Example of the OPT-GM approach for phenotyping the heart and the limb in an Apert syndrome mouse embryo at embryonic day E11.5. The embryo was labeled using whole-mount in-situ hybridization (WISH) to visualize the gene expression domain of Dusp6. A) Embryo reconstruction showing the expression of Dusp6 (purple) in the right forelimb, as well as some of the 3D landmarks collected to quantify the shape of the limb (green dots) and the shape of the Dusp6 expression domain (yellow dots). B) Embryo reconstruction showing the segmentation of the four heart chambers (yellow: right ventricle, green: left ventricle, red: left atrium, blue: right atrium) from different views. The right bottom panel shows the segmentation of the Dusp6 expression domain within each heart chamber.

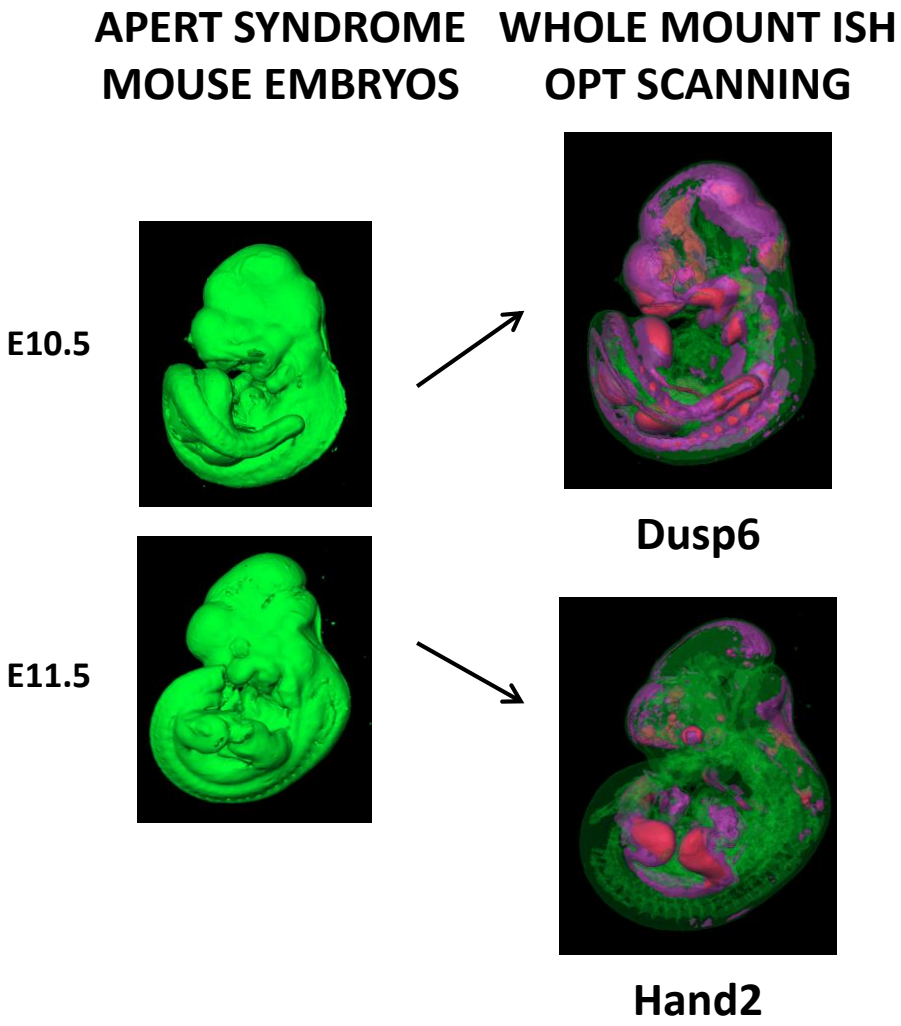

Fig. 3. Schematic representation of the experimental procedure. 1) Mouse embryos of the Apert syndrome mouse model were breed at embryonic days E10.5 and E11.5; 2) Mouse embryos were WISH labeled either for Dusp6 or Hand2; 3) OPT scanning: the images show surface reconstructions using different thresholds for the embryo surface (green), moderate gene expression (purple) and high gene expression (red).