

Supplemental Figure Legends

Supplemental Figure 1. Comparison of RNAscope images under white light and fluorescence light. Ten-week-old SHP2CTR^{Agcl/ER} mice and *Sox9* probe were used. *Sox9* mRNA molecules were visualized as red chromogenic dots under white light and as red pseudofluorescence dots under fluorescence light. The length of the scale bar represents 50μm.

Supplemental Figure 2. Breeding scheme diagram and table of shorthand nomenclature with corresponding genotypes.

Supplemental Figure 3. Preparatory steps for cryostat sectioning of undecalcified skeletal tissue using Kawamoto's film. ①Cut the Kawamoto's film into small pieces based on the sample size. ②Place the film on the modified sample. ③Ensure that the film adheres firmly to the sample using a stick or roller. ④Section the sample. ⑤Place the non-adhesive side of the film onto the slide.

Supplemental Figure 4. Detailed information on RNAscope probes used. The table provides the catalog number, commercial name, target mRNA, and target region of each probe.