Vessel network architecture of adult human islets promotes distinct cell-cell interactions in situ and is altered after transplantation

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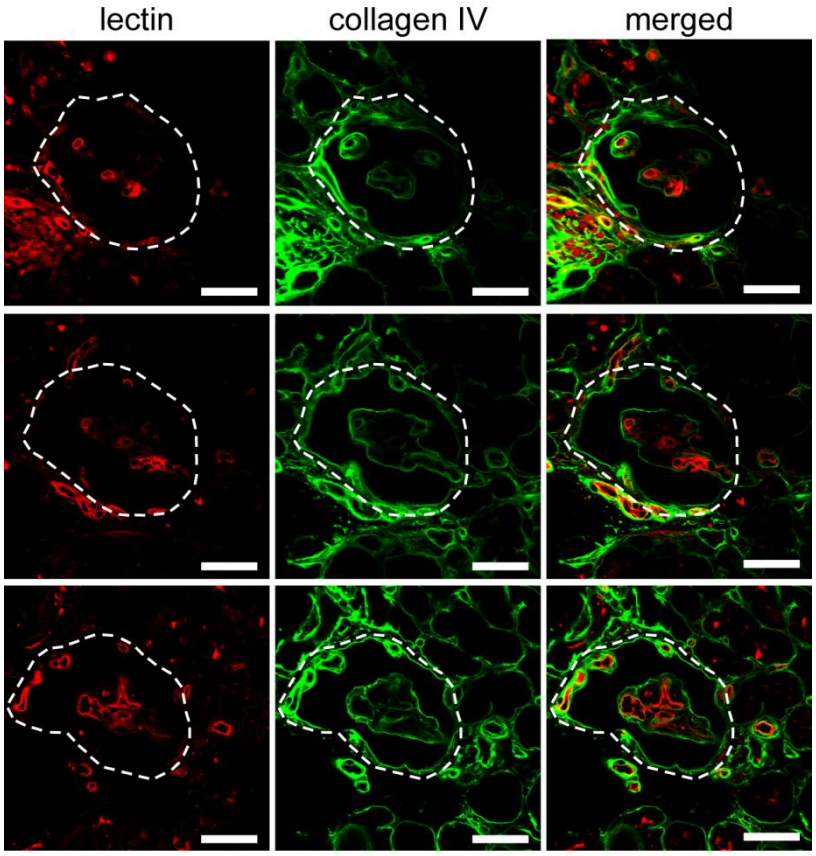
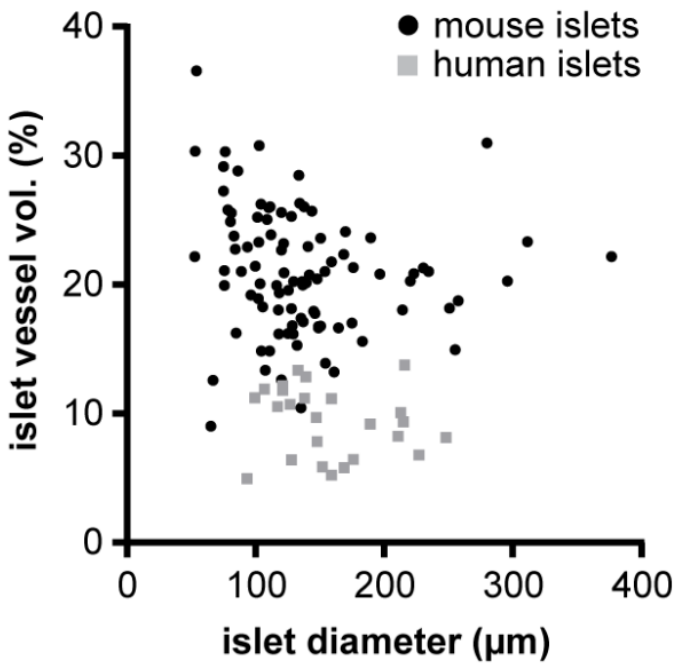
Supplemental Material

Supplemental Figure 1



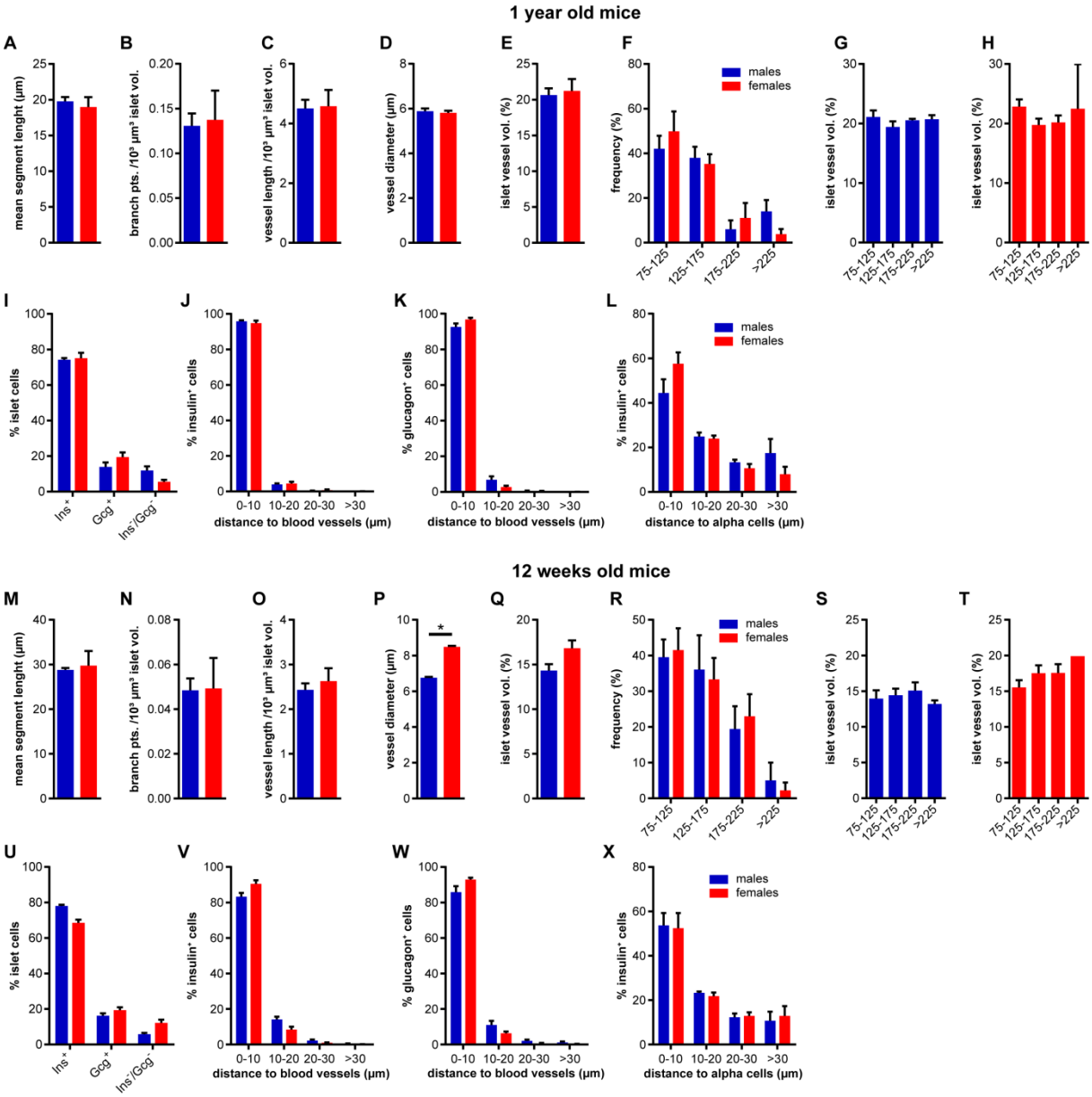
Supplemental Figure 1 – Visualization of human islet vasculature in situ with Lectin type IV collagen antibody staining. Selected optical XY sections through a human islet (dotted lines) in a pancreas tissue slice showing Lectin (red, left panels) and type IV collagen staining (green, middle panels) as well as the merged images (right panels). Lectin^{+} vessel structures are delineated by strong type IV collagen staining while thinner type IV collagen structures are Lectin^{-}. Staining was performed as described in the methods section with an antibody to type IV collagen (1:200, Abcam). Scale bars = 50 µm

Supplemental Figure 2



Supplemental Figure 2 – Correlation of islet vessel volume and islet diameter. Islet vessel volume of mouse (black dots) and human (grey boxes) plotted against islet size.

Supplemental Figure 3



Supplemental Figure 3 – Vascular network and spatial distribution of aged and young islets *in situ* separated by gender. (A-L) *In situ* data on aged mouse islets (1-year old mice) from male (blue bars) and females (red bars). (A-H) *In situ* islet vessel network analysis with mean vessel segment length (A), normalized number of branch points (B), normalized vessel length (C), mean vessel diameter (D), mean islet vessel volume fraction (E), islet size distribution (F) and mean islet vessel volume fraction grouped by islet size of males (G) and females (H). Composition and spatial distribution of endocrine cells (I-L): Compositional analysis of insulin positive (Ins^+), glucagon positive (Gcg^+) and insulin/glucagon negative (Ins^-/Gcg^-) cell volumes in males and females (I), distribution of insulin$^+$ cell nuclei (J) and glucagon$^+$ cell nuclei (K) minimum distance to blood vessel surface in mouse and human islets *in situ*.

Distribution of insulin$^+$ cell nuclei minimum distance to glucagon$^+$ cell surface in males and females (L). (M-X) *In situ* data on young mouse islets (12-weeks old mice) from male (blue bars) and females (red bars). (M-T) *In situ* islet vessel network analysis with mean vessel segment length (M), normalized number of branch points (N), normalized vessel length (O), mean vessel diameter (P), mean islet vessel volume fraction (Q), islet size distribution (R) and mean islet vessel volume fraction grouped by islet size of males (S) and females (T). Composition and spatial distribution of endocrine cells (U-X): Compositional analysis of insulin positive (Ins$^+$), glucagon positive (Gcg$^+$) and insulin/glucagon negative (Ins$^-$/Gcg$^-$) cell volumes in males and females (U), distribution of insulin$^+$ cell nuclei (V) and glucagon$^+$ cell nuclei (W) minimum distance to blood vessel surface in mouse and human islets *in situ*. Distribution of insulin$^+$ cell nuclei minimum distance to glucagon$^+$ cell surface in males and females (X). Values are mean±SEM for n=4-5 mice per gender and age; *P <0.05.