**Supplementary Files**

**Supplementary File 1. Statistical Information**

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| **Figure**  | **N(sample size)**  | **Statistical test method** | ***p*-value**  |
| Figure 1A  | WT: 81APN-KO: 72  | Log-rank (Mantel-Cox) test |  *p*=0.0435  |
|  Figure 1B  | WT: 63 APN-KO: 60  | Log-rank (Mantel-Cox) test | *p*=0.0002 |
| Figure 2A  | WT: 32APN-KO: 43 | Unpaired *Student’s t* test | Week110: *p=*0.0039  |
| Figure 2D | WT: 8APN-KO: 7  | Unpaired *Student’s t* test | Time 15’: *p=*0.0084Time 30’: *p=*0.0077  |
| Figure 2E | WT: 9APN-KO: 10 | Unpaired *Student’s t* test | 1h: *p=*0.0498 2h: *p=*0.0027 |
| Figure 2F | WT: 8APN-KO: 8 | Unpaired *Student’s t* test | 2h: *p=*0.0064 |
| Figure 2H | WT: 8 APN-KO: 7 | Unpaired *Student’s t* test in each time point | *Day1*: *Minimum p=*0.0010*Day2*: *Minimum p=*0.0060 *Day3*: *Minimum p=*0.0244*Day4*: *Minimum p=*0.0089  |
| Figure 4A  | NCD WT:10 APN-KO:10HFD:WT:10 APN-KO:10 | Unpaired *Student’s t* test | *Tnf-* aNCD: *p=0.0377**Il1b* NCD: *p=* 0.0024*F4/80* NCD*: p=0.0015**Mcp-1* NCD*: p=0.0085**Crp* NCD*:p=0.0019**Tnf-* aHFD: *p=0.0201**Il1b* HFD: *p=* 0.0502*F4/80* HFD*: p=0.2100**Mcp-1* HFD*: p=0.0466**Crp* HFD*:p=0.0176* |
| Figure 4B | NCD WT:8-10APN-KO:8-10HFD:WT:8-10 APN-KO:8-10 | Unpaired *Student’s t* test | *Tnf-* aNCD: *p=0.0486**Il1b* NCD: *p=0.0215* *F4/80* NCD*: p=0.0136**Mcp-1* NCD*: p=0.0027**Crp* NCD*:p=0.0336**Tnf-* aHFD: *p=0.0055**Il1b* HFD: *p=* 0.0119*F4/80* HFD*: p=0.0246**Mcp-1* HFD*: p=0.0495**Crp* HFD*:p=0.0767* |
| Figure 4C | HFD:WT:3 APN-KO:3 | Unpaired *Student’s t* test | Total macrophage:p=0.0209Kuffer cell:p=0.0076 0.1348Monoctes-derived macrophage:p= 0.1348  |
| Figure 4D |  Old  WT: 6 APN-KO:6Young:WT:5 APN-KO:5  | Unpaired *Student’s t* test | *Il6 Old*: *p=*0.0200*Il6 Young:**p=*0.5250*Tnf-* a *Old*:*p=*0.0225*Tnf-*a *Young:**p=*0.8918*Tnf-*a *WT：**p=*0.0154*Col1a1 Old:**p=*0.0382*Col1a1 Young:**p=*0.0381*Col1a1 WT:**p=*0.0007a*Sam Old:**p=*0.0271a*Sam Young:**p=*0.7808a*Sam WT:**p=*0.0012 |
| Figure 4E  | WT: 6APN-KO: 6 | Unpaired *Student’s t* test | AST: *p=*0.0134ALT: *p=*0.0073 |
| Figure 4G  | WT: 6 or 10APN-KO:10 | Unpaired *Student’s t* test | Kidney Cdkn2a:p=0.0013Kidney Glb-1:p=0.0083Liver Cdkn2a:p=0.046Liver Glb-1:p=0.1228 |
| Figure 4H  | WT: 7-10APN-KO:8-10 | Unpaired *Student’s t* test | Kidney Cdkn2a:p=0.3338Kidney Glb-1:p=0.0112Liver Cdkn2a:p=0.4892Liver Glb-1:p=0.0245 |
| Figure 5A | Control: 45DGly: 37 | Log-rank (Mantel-Cox) test | *p=*0.7048 |
| Figure 5C  | Glucose and Insulin Control: 7 DGly: 8IGF-1: Control: 10DGly: 9 | Unpaired *Student’s t* test | Fasting Glucose: *p<*0.0001  Fasting Insulin: *p=*0.0017*IGF-1: p=0.0015* |
| Figure 5D | Control Islets: 54 DGly Islets: 58  | Unpaired *Student’s t* test | *p*=0.0012 |
| Figure 5E  | Control: 8 DGly: 8 | Unpaired *Student’s t* test | Time0’: *p<*0.0001Time120’:*p*=0.0132 |
| Figure 5F | Control: 7 DGly: 8 | Unpaired *Student’s t* test | Time0’: *p=* *0.006*Time15’:*p*=0.05 |
| Figure 5G  | Control: 8 DGly: 8 | Unpaired *Student’s t* test | Time15’: *p=0.0014*Time30’: *p=*0.0012Time60’: *p=0.0566*Time90’: *p=0.0137*Time120’: *p=*0.5305 |
| Figure 5H  | Control: 8 DGly: 9 | Unpaired *Student’s t* test | 2h*: p=*0.0127 6h*: p=*0.0247  |
| Figure 5I | Control: 8 DGly: 9 | Unpaired *Student’s t* test | *p=*0.0138 |
| Figure 5J | Control: 8 DGly: 9 | Unpaired *Student’s t* test | Time 0’: *p=*0.0476 |
| Figure 6C | Control: 8 DGly: 6 | Unpaired *Student’s t* test | *SAT: p=*0.2244*WAT: p=*0.0042 |
| Figure 6F | Control: 8 DGly: 6 | Unpaired *Student’s t* test | *F4/80: p=*0.0216*Il1b: p=*0.0618*Mcp: p=*0.0318a*Sam: p=*0.0714*Col1a1: p=*0.0383*Col3a1: p=*0.0198 |
| Figure 6G | Control: 5 DGly: 5 | Unpaired *Student’s t* test | Corticosterone*: p=0.0003* |
| Figure 1-figure supplement 1C | WT: 4 APN-KO: 4 Control: 4 DGly: 4 | Unpaired *Student’s t* test | *WT&APN-KO:**p<*0.0001 *WT&* DGly*: p=*0.0052 |
| Figure 2-figure supplement 1A | NCD WT:5 APN-KO:5HFD:WT:5 or 7 APN-KO:5 | Unpaired *Student’s t* test | *Fat mass NCD:p=0.2347**Lean mass NCD:p=0.3571**SAT NCD:p=0.0048**WAT NCD:p=0.0804**BAT NCD:p=0.9056**Fat mass HFD:p=0.0509**Lean mass HFD:p=0.1000**SAT HFD:p=0.3646**WAT HFD:p=0.4305**BAT HFD:p=0.8378* |
| Figure 2-figure supplement 1B | NCD WT:5 APN-KO:5 | Unpaired *Student’s t* test | *TMC NCD:p=0.1095**BMD NCD:p=0.8645**Spinal BMD:p=0.1151**Femoral BMD:p=0.2356* |
| Figure 2-figure supplement 1C | HFD:WT: 7 APN-KO:4 | Unpaired *Student’s t* test | *TMC HFD:p=0.0005**BMD HFD:p=0.0099**Spinal HFD:p=0.0038**Femoral HFD:p=0.0001* |
| Figure 2-figure supplement 1E | WT: 5 APN-KO: 6 | Unpaired *Student’s t* test | Kidney weight*:p=*0.0416 |
| Figure 4-figure supplement 1A | WT:7 APN-KO:7 | Unpaired *Student’s t* test | *Il6: p=*0.0245*Tnf-* *: p=*0.0106*F4/80: p=*0.0324*Il1b: p=*0.0006*Mcp: p=*0.0027a*Sam: p=*0.2525*Col1a1: p=*0.1531*Col3a1: p=*0.0132 |
| Figure 4-figure supplement 1B | WT: 5 APN-KO: 5 | Unpaired *Student’s t* test | NCD*: p=0.0539*HFD*:p=0.0741* |
| Figure 4-figure supplement 1C | WT: 6 APN-KO: 6 | Unpaired *Student’s t* test | *Il1b Hepatocyte: p=0.4220**Il1b Macrophage: p=0.0366**Tnf-*  *Hepatocyte: p=0.9936**Tnf-*  *Macrophage: p=0.0015**CD11b Hepatocyte: p=0.8656**CD11b Macrophage: p=0.7710**F4/80 Hepatocyte: p=0.6995**F4/80 Macrophage: p=0.0545**CD206 Hepatocyte: p=0.1125**CD206 Macrophage: p=0.0128* |