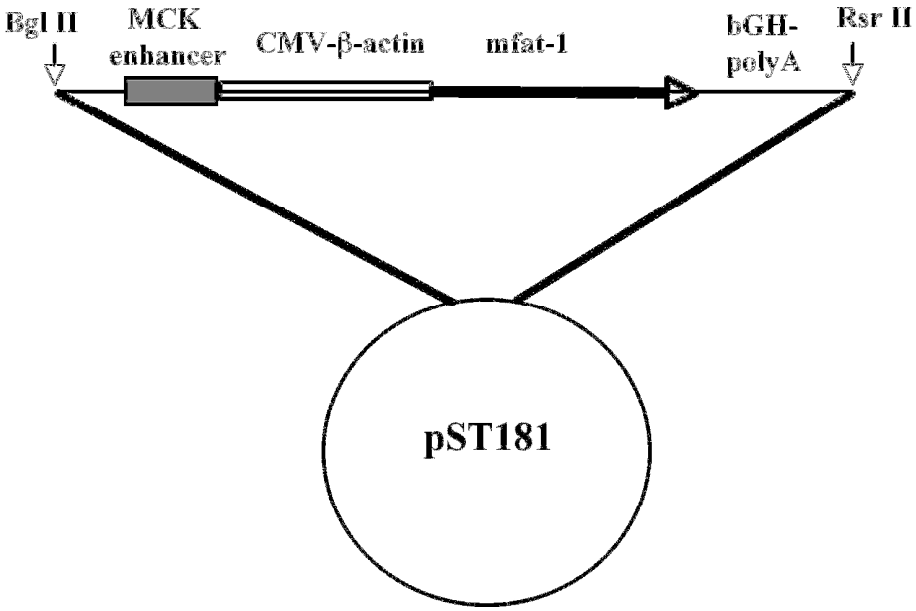
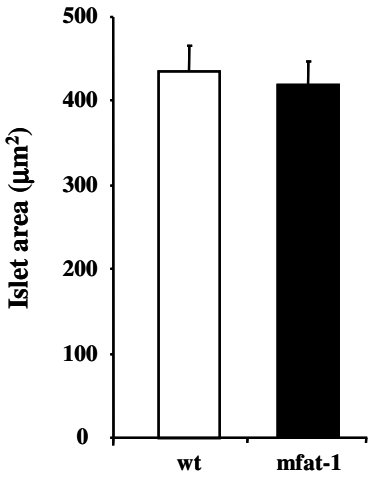
Supplemental Figure 1:



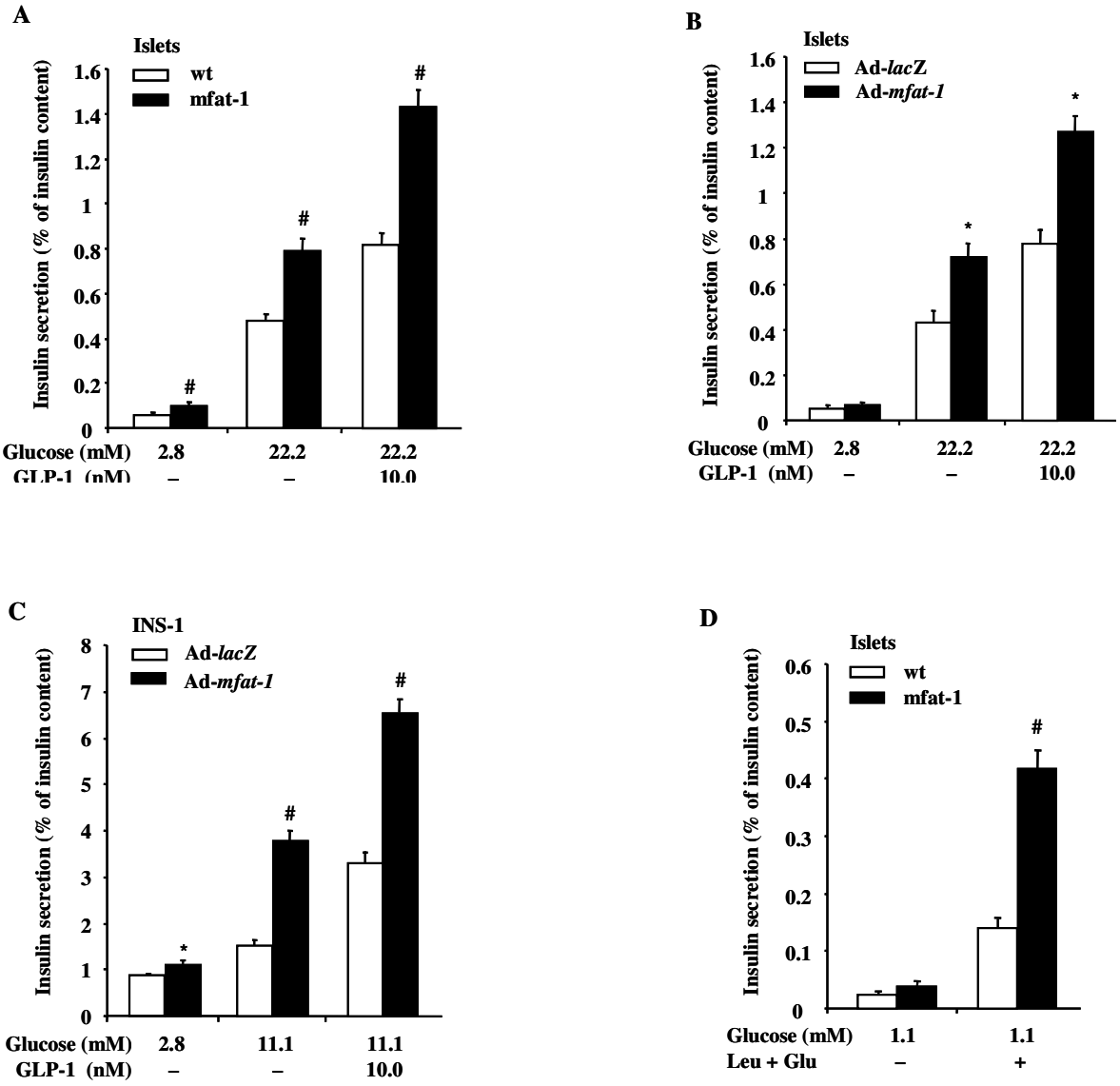
Supplemental Figure 1: The DNA construct for transgenic expression of *mfat-1* cNDA. Muscle creatine kinase (MCK) enhancer is tethered to the CMV-chicken-β-actin promoter. The *mfat-1* cDNA, whose codons were modified for efficient translation in mammalian system, was placed right behind the CMV- β-actin promoter. A bovine growth hormone (bGH) poly-A-tail was attached at the immediate 3'-end of *mfat-1* cDNA. The entire expression cassette was excised from the pST181 plasmid using Bgl II and Rsr II restriction enzymes for pro-nuclear injection. The mfat-1 transgenic mice were identified by PCR assay of tail DNA samples with forward primer 5'-GGACCTTGGTGAAGAGCATCCG-3', and reverse primer 5'-GCGTCGCAGAAGCCAAAC-3', resulting in a 438 bp fragment.

Supplemental Figure 2

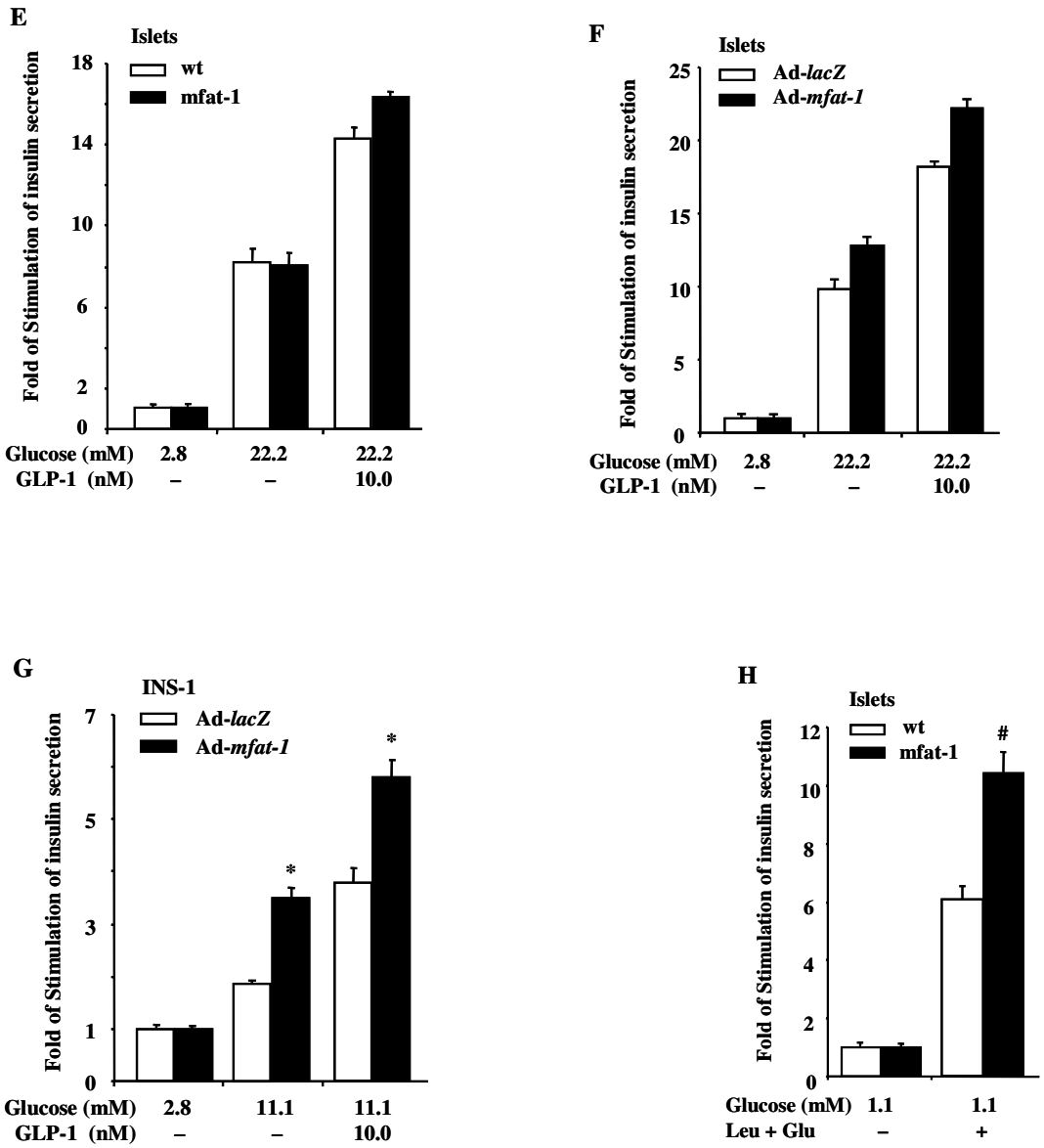


Supplemental figure 2 Islet size in wild type and transgenic mice. Pancreases obtained from the wild type and mfat-1 transgenic mice at the age of 10 weeks were stained with antibody against insulin (Cell Signaling). Islet area was determined by imaging at 10× magnification using an Olympus IX70 microscope followed by computation with FLUOVIEW FV300 software. The analysis was based on randomly selected islets on the pancreatic sections from each of four animals (22 islets per animal) in each group.

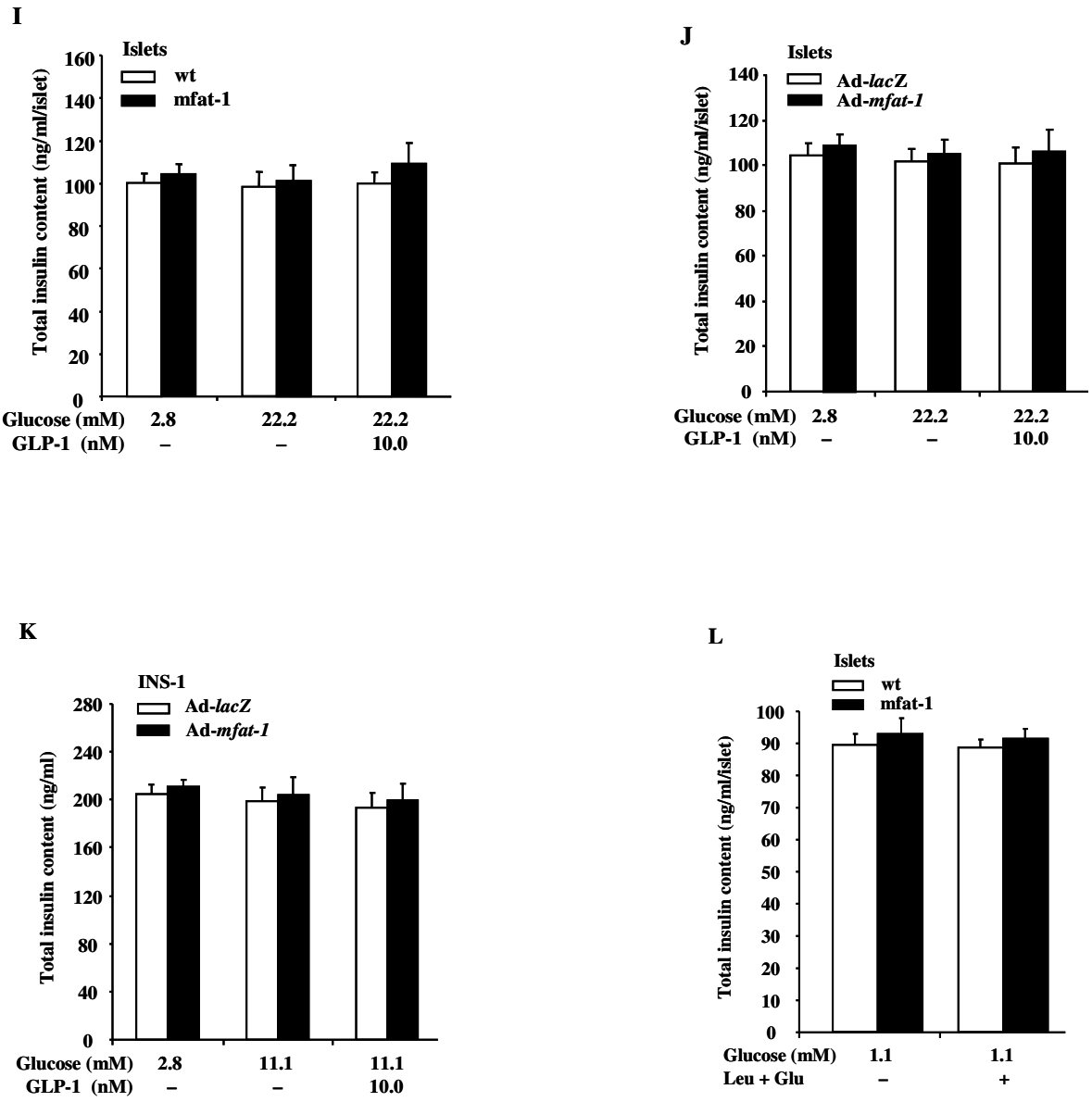
Supplemental Figure 3



Supplemental Figure 3 (A-D). Increased insulin secretion in response to the stimulation by glucose, amino acids (leucine+glutamine), and GLP-1. These are exactly the same experiments as described in the figure legends of Figure 1 (A-D), except that insulin secretion is expressed as the total secreted insulin as a percentage of cellular insulin content. #P<0.01, *P<0.05 when compared to the corresponding control group.



Supplemental Figure 3 (E-H). The fold of stimulation of insulin secretion in response to the stimulation by glucose, amino acids, and GLP-1. These are exactly the same experiments as described in the figure legends of Figure 1 (A-D). The insulin secretion levels at baseline (2.8 mM glucose or 1.1 mM glucose) are set as 1. * P<0.05 when compared to the corresponding control group.



Supplemental Figure 3 (I-L). Total insulin content in response to stimulation by glucose, amino acids (leucine+glutamine), and GLP-1. These are exactly the same experiments as described in the figure legends of Figure 1 (A-D). At the end of each incubation, the cells or islets were harvested in KRBB for ELISA determination of cellular insulin content. The total insulin content of transgenic islets was not significantly different from that of the wild type islets.