Supplementary Table 1. Diet Composition. (A) Diet composition and (B) fatty acid composition of the control diet and high fat diet.

Supplementary Figure 1. Induction of hypoperfusion in the abdominal aortic wall. (A) The infra-renal aorta was exfoliated from the perivascular tissue. (B) Vessels branching from the abdominal aorta were then ligated with a 5-0 silk string to block the blood supply. (C) A plastic catheter, shortened to 9 mm in length, was inserted via a small incision adjacent to the renal artery branches, and the incision was then repaired with a 6-0 monofilament string. (D) In the sham operation, the abdominal aorta was not ligated. (E) 5-0 silk that blocked the blood in the aorta untiled and blood flow was again confirmed. (F) The abdominal aorta was ligated with a 5-0 silk string together with the plastic catheter. (G) 5-0 silk which blocked the blood in the aorta untiled and blood flow was again confirmed.

Supplementary Figure 2. Weight change, food intake and serum parameters (A) Body weight change of the rats in the control and high fat groups. (B) Food intake calorie of the rats in the control and high fat groups. Serum triglyceride (TG) levels (C) and total cholesterol levels (D) of the rats in the control and high fat group. Data is represented as the mean ± s.e.m. Control group (n = 18), high fat group (n = 13). Values with different letters are significantly different ($P < 0.05$).

Supplementary Figure 3. Thickness of medial wall. (A-D) Representative images of immunostaining for α-smooth muscle actin (scale bar = 200 μm). (E) Quantification of α-smooth muscle actin-positive areas of the vascular wall. (F) Quantitative analysis of medial wall thickness in the control and high fat groups. Values with different letters are significantly different ($P < 0.05$).

Supplementary Figure 4. Immunohistochemical staining for MCP-1 and MAC387+ monocytes/macrophages. (A-D) Representative images of immunostaining for MCP-1 (scale bar = 100 μm). (F-I) Representative images of immunostaining for MAC387+ monocytes/macrophages (scale bar = 100 μm). (E) Quantification of MCP-1-positive areas of the vascular wall. (J) Quantification of MAC387+ monocyte/macrophage-positive areas of the vascular wall. Data is represented as the mean ± s.e.m. Control group (n = 18), high fat group (n = 13). Values with different letters are significantly different ($P < 0.05$).

Supplementary Figure 5. (A-F) MT staining Representative images of immunostaining for MT staining (scale bar = 100 μm).

Supplementary Figure 6. Proposed mechanism of the effect of high fat diet on AAA. The normal aorta keeps collagen and elastin fiber. The adipocytes ware induced by hypoperfusion of the vascular wall. Intake of excess fat occurred in larger amounts of hypertrophic adipocytes. The adipocytes increased macrophages infiltration and MMPs activity in the area with adipocytes and resulted in weakening of the vascular wall. In conclusion, a high fat diet may induce the development of AAA and increase AAA rupture risk.