

The Apolipoprotein E knockout mouse model is one of the most widely used experimental model of atherosclerosis. These mice rapidly develop atherosclerotic lesions that resemble human lesions evolving over time from initial fatty streaks to complex lesions..

Pathophysiological features

Cardiovascular features

- Apolipoprotein E deficiency directly results in the increase of plasma levels of LDL and VLDL.
- Spontaneous development of atherosclerotic lesions throughout the arterial tree appearing first in the aortic arch in young mice and progressing in the thoracic and abdominal aorta in older mice, which can be further accelerated by a lipid-rich diet or type I diabetes induction by streptozotocin (cf. Streptozotocin-induced diabetic rats/mice (STZ)) (figure 1).
- Vascular endothelial dysfunction:

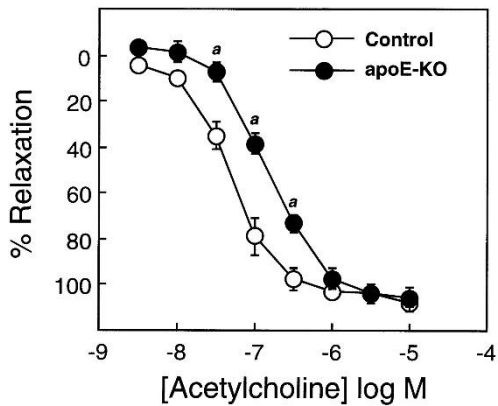
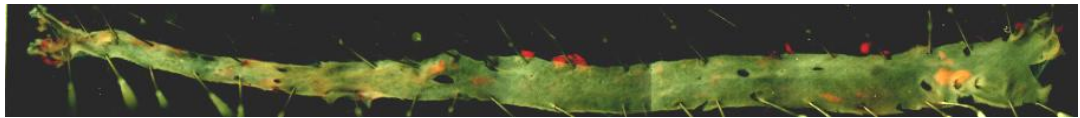
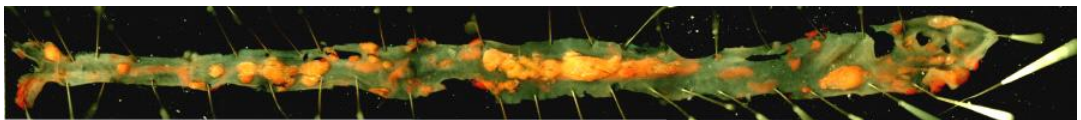


Figure 1: Concentration-dependent relaxation to ACh of thoracic aorta from control (n=5) and apoE-KO mice (n=9) fed high-fat diet for 23 weeks. Aortic segments precontracted with NE at a concentration that gave approximately 75% of maximal contraction and relaxed by cumulative addition of ACh. Points are mean±SEM. a, $P < 0.01$ vs control mice. (From Deckert et. Al, 1999).

C57BL6/J mouse aorta – 26 weeks of age



ApoE-KO mouse aorta – 26 weeks of age



Erectile function features

- Erectile dysfunction from 26 weeks of age in ApoE KO mice fed a lipid-rich diet from 4 weeks of age (figure 2).

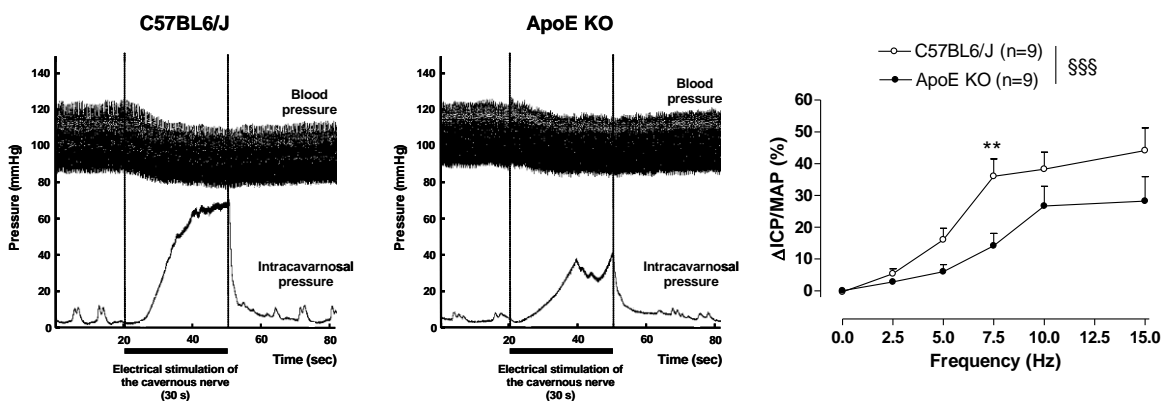


Figure 2: In vivo evidence of erectile dysfunction in 26 week-old ApoE KO mouse. From Behr-Roussel et al., 2006. (*** $p < 0.001$ two-way ANOVA, followed by a Bonferroni's post-test ** $p < 0.01$, compared to age-matched C57BL6/J mouse.

Summarized methodology

- In ApoE KO mice, the development of atherosclerosis can be accelerated by a lipid-enriched Western-diet. Age-matched C57BL6/J mice fed with standard mouse chow are used as control mice.

Related Pelvipharm bibliography:

Behr-Roussel D et al. *J Sex Med* (2006):3(4):596-603

NB: Pelvipharm will gladly study the feasibility to fit this experimental model to its client's needs.