

Vasoconstrictor effect of lysophosphatidic acid (LPA) depends on fatty acid chain saturation and age

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We have reported recently that LPA₁ receptor activation in the vascular smooth muscle evokes cyclooxygenase 1 (COX1) mediated thromboxane A₂ release and subsequent vasoconstriction.

Here we aimed to compare the vasoconstrictive effects of natural LPAs, identify their signal transduction, and determine age-related changes of 18:2 LPA induced constriction using wire myography and qPCR in the mouse aorta.

Saturated LPAs had no vasoconstrictor activity, whereas increase in the number of double bonds resulted in increased constriction. Vasoconstrictor effect disappeared in the LPA₁-knock-out (KO) vessels. 18:2 LPA mediated constriction was increased in the aortas of the 32-week as compared to the 8-week old mice, while the expression of LPA₁ receptor and dose-response curves of the thromboxane receptor agonist U-46619 were not different. 18:2 LPA mediated constriction was diminished in vessels of both the 8-week and 32-week COX1-KO animals.

In conclusion, polyunsaturated LPAs appear to have strong, age-dependent vasoconstrictor activity mediated by LPA₁ and COX1.

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