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Role of NOX1 in intestinal barrier dysfunction

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Reactive oxygen species (ROS) generated by administration of lipopolysaccharide (LPS) are known to cause intestinal barrier dysfunction. When ROS production was quantified with L-012 by *in vivo* imaging system, the bioluminescent signal of L-012 was markedly increased in the abdomen of mice treated with LPS (6 mg/kg i.p.). However, increased ROS production was significantly attenuated in *Nox1*- or *iNOS*-deficient mice. In *wild-type* mice (*WT),* administration of LPS elicited a marked increase in intestinal mucosal permeability determined by the amount of fluorescein isothiocyanate-labeled dextran (FD-4) transferred from the gut lumen into circulation. Increased intestinal permeability induced by LPS was significantly suppressed in *Nox1- or iNOS*-deficient mice. While histological analysis demonstrated no apparent change in the intestinal structure, decreased levels of tight junction proteins, occludin and ZO-1, were observed in the ileum of WT treated with LPS. At the same time, activation of matrix metalloproteinase-9 (MMP9) was depicted in the ileum of *WT* but not of *Nox1*-deficient mice. Taken together, ROS derived from NOX1 may increase the activity of MMP9 to elicit intestinal barrier dysfunction during endotoxemia.