Abstract

Staphylococcus aureus is the most commonly found Gram-positive bacterium in patients admitted to intensive-care units, causing septicaemia or pneumonia. *S. aureus* is considered to play an important role in the induction of cell adhesion molecules. Resveratrol, a compound found in the skins of red fruits, may inhibit the inflammatory signalling pathways involved in lung diseases. In the present paper, we have shown that resveratrol reduced *S. aureus*-mediated VCAM-1 (vascular cell adhesion molecule-1) expression in HPAEpiCs (human lung epithelial cells) and lungs of mice. In an *in vivo* study, we have shown that resveratrol inhibited *S. aureus*-induced pulmonary haematoma and leucocyte count in BAL (bronchoalveolar lavage) fluid in mice. In an *in vitro* study, we observed that resveratrol attenuated *S. aureus*-induced TLR2 (Toll-like receptor 2), MyD88 (myeloid differentiation factor 88) and PI3K (phosphoinositide 3-kinase) complex formation. *S. aureus* stimulated Akt, JNK1/2 (c-Jun N-terminal kinase 1/2) and p42/p44 MAPK (mitogen-activated protein kinase) phosphorylation, which were inhibited by resveratrol. In addition, *S. aureus* induced IκB (inhibitor of nuclear factor κB) α and NF-κB (nuclear factor κB) p65 phosphorylation and NF-κB p65 translocation, which were reduced by resveratrol. Finally, we found that *S. aureus* induced NF-κB and p300 complex formation and p300 phosphorylation, which were inhibited by resveratrol. Thus resveratrol functions as a suppressor of *S. aureus*-induced inflammatory signalling not only by inhibiting VCAM-1 expression, but also by reducing TLR2–MyD88–PI3K complex formation and Akt, JNK1/2, p42/p44 MAPK, p300 and NF-κB activation in HPAEpiCs.