**Introduction**

Arsenic is a naturally occurring toxic element that is present in air, food and water. Although epidemiological studies indicated that high levels of arsenic exposure through drinking water are related to the increasing risk of cardiovascular diseases, including atherosclerosis, the molecular mechanism underlying arsenic-induced cardiovascular diseases remains obscure. Therefore, this study aimed to elucidate this molecular mechanism.

**Materials and methods**

END·D cells (mouse aortic endothelial cell line) were treated with various concentration of sodium arsenite (SA) for the indicated times. The expression of lectin-like oxidized low density lipoprotein (oxLDL) receptor-1 (LOX-1) at either mRNA or protein levels was determined using quantitative reverse transcription-polymerase chain reaction (qRT-PCR) or western blot analysis, respectively. Cellular uptake of Dil (fluorescence)-labeled oxLDL was measured using both fluorescence-activated cell sorting (FACS) analysis and confocal microscopy. Reactive oxygen species (ROS) generation was detected with a DCFH·DA fluorescent probe using FACS analysis. Statistical significance between groups was determined using one-way ANOVA and Dunnett's comparison.

**Results**

We examined changes in the mRNA level of LOX-1 in END·D cells, after SA treatment. SA treatment significantly upregulated LOX-1 mRNA expression; this finding was also verified at the protein expression level. FACS and fluorescence microscopy analyses showed that the cellular uptake of Dil·oxLDL was significantly augmented with SA treatment. In addition, an anti-LOX-1 antibody completely abrogated the SA-augmented uptake of Dil·oxLDL. We observed that SA increases the levels of the phosphorylated forms of nuclear factor of kappa light polypeptide gene enhancer in B cells (NF·κB)/p65. SA-induced upregulation of LOX-1 protein expression was clearly prevented by treatment with an antioxidant, N-acetylcysteine (NAC), or an NF·κB inhibitor, caffeic acid phenethylster (CAPE). Furthermore, SA-augmented uptake of Dil·oxLDL was also prevented by treatment with NAC or CAPE.

**Discussion**

Our present study indicates that arsenic upregulates LOX-1 expression through the reactive oxygen species-mediated NF·κB signaling pathway, followed by augmented cellular oxLDL uptake, thus highlighting a critical role of the aberrant LOX-1 signaling pathway in the pathogenesis of arsenic-induced atherosclerosis.

**Conclusions**

Our novel findings raise the possibility that arsenic exposure can promote the pathogenic actions of oxLDL by evoking an aberrant LOX-1 signaling pathway, thus implicating the pathophysiology of arsenic-induced cardiovascular diseases.