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## The effect of varying concentrations of magnesium on expression of human endothelia adhesion molecules

Lujain Abdulaziz Almousa, Andrew M Salter and Simon C Langley-Evans  
The University of Nottingham, UK

Magnesium is required for many physiological reactions. It is a cofactor in many metabolic processes and is essential in the synthesis of DNA and RNA. Magnesium status may impact upon cardiovascular health. Low extracellular magnesium concentrations have a negative impact on endothelial cell proliferation, increase monocyte adhesion, inhibit cell migration and markedly alter endothelial cell gene expression. In this study we investigated whether different concentrations of magnesium sulfate could affect the gene expression for adhesion molecules in human umbilical vein endothelial cells (HUVEC). HUVECs were cultured in different MgSO<sub>4</sub> concentrations: 0.1 mM, 5 mM and compared to the physiological circulating concentration (1 mM). Total RNA was extracted, followed by cDNA synthesis, in order to determine expression of Intercellular Adhesion Molecule-1 (ICAM-1) and Vascular Cell Adhesion Molecule-1 (VCAM1), low magnesium (0.1 mM) significantly up-regulated ICAM (46%,  $P < 0.05$ ) but not VCAM relative to physiological concentration within 24 hours. On treatment of cells with 0.5  $\mu$ g lipopolysaccharide (LPS) for 4 hours to induce an inflammatory response, it was noted that the effect of low magnesium persisted for ICAM and that VCAM was also up-regulated relative to the control. In contrast, the high magnesium concentration reduced the cell adhesion molecule expression (VCAM 74%, ICAM 56%,  $P < 0.05$ ) when cells were incubated with LPS. The present study has demonstrated that low magnesium increases adhesion molecule expression, which induces an overexpression of the inflammatory phenotype in endothelial cells. Additional magnesium suppresses the inflammatory response. The findings of this study support the importance of the nutritional intake of magnesium in maintenance of cardiovascular health.

### Biography

Lujain Abdulaziz Almousa has completed her Doctorate in Human Nutrition from College of Food and Agricultural, King Saud University in 2012. Master's degree in General Nutrition in 2007 and Bachelor's degree in Nutrition and Food Science in 2002 from Princess Nora bint Abdul Rahman University, KSA. Presently she is pursuing PhD degree at The University of Nottingham, UK.

sbxla@nottingham.ac.uk

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