The Pentraxin 3: An Inflammatory Molecule Able To Modulate The Vascular Tone

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The pentraxin3, the prototype of long pentraxins, is an acute phase protein of inflammation. Several studies have correlated the levels of pentraxin3 with cardio-cerebrovascular diseases and recently with hypertension. Actually, there are no studies showing whether pentraxin3 is able to modulate, per sé, vascular tone. For this purpose we evaluated in resistance vessels of mice (mesenteric artery) the effect of pentraxin3 in a longer exposure time, simulating the post releasing phase, characterized by the presence of the protein in blood and in contact with the vascular wall. The incubation of mesenteric artery with pentraxin3 for 45' (20ng/mL), evoked a significant endothelial dysfunction evidenced by a reduced acetylcholine vasorelaxation and mediated by COX2 pathway. Nitroglycerin vascular action was unaffected by pentraxin3 exposure. Immunohistochemical and immunoblotting studies performed both on mesenteric artery and human endothelial cells showed an increase of COX-2 expression following pentraxin3 administration. Interestingly, endothelial dysfunction was still evident after pentraxin3 removal from medium. The electron microscopy analysis of vessels treated with pentraxin3 showed a selective morphological alteration of endothelial structure with the disintegration of the cytoplasm, fragmentation of the cytoplasmic membrane and detachment of the basal lamina. Finally, the vascular effects of pentraxin3 were present also in human vessels (superior thyroid artery). Our results demonstrate, for the first time, that pentraxin3 is able to modulate vascular tone depending on exposure time and on the amount of protein released. These results candidates pentraxin3 as a possible target for future therapeutic strategies aimed to reduce endothelial dysfunction and cardiovascular diseases.