



Decreased concentration of extracellular heat shock protein 70 and gene expression of Toll-like receptor 4 after lung transplantation in COPD patients

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Introduction

Heat shock protein 70 (Hsp70) can be found in the extracellular compartment and it is considered that extracellular Hsp70 (eHsp70) contributes to inflammation in chronic obstructive pulmonary disease (COPD). eHsp70 mainly acts pro-inflammatory and activates immune responses by engaging Toll-like receptors (TLRs) 2 and 4. Moreover, it may be involved in ongoing chronic inflammation that is present in patients with end-stage COPD who are candidates for lung transplantation (LT).

Aims and objectives

The aim of the study was to compare eHsp70 concentration and *TLR2* and *TLR4* gene expression in 5 COPD patients before LT and one year after LT.

Methods

Spirometry was performed before and after LT. Dyspnoea grade was assessed by modified Medical Research Council (mMRC), symptoms burden and history of exacerbations by COPD Assessment Test (CAT score), and health status by St. Georges Respiratory Questionnaire (SGRQ-C) score for COPD patients. Concentration of eHsp70 was measured by enzyme-linked immunosorbent assay (ELISA) (Enzo Life Science, Farmingdale, NY, USA), while *TLR2* and *TLR4* expression was examined by quantitative polymerase chain reaction (qPCR) in the peripheral blood samples using the TaqMan gene expression assays (Applied Biosystems, Foster City, CA, USA). The calculation of the relative gene expression was performed by the $2^{-\Delta\Delta Ct}$ method. Results were statistically significant if $P < 0.05$.

Conclusion

eHSP70 concentration and *TLR4* expression were decreased in lung transplant recipients with COPD one year after LT suggesting their potential significant role in the pathogenesis of severe COPD.

Results

Parameter	COPD patients before LT	COPD patients after LT	P-value
FEV ₁ (L)	0.59 (0.47 - 0.75)	3.22 (2.02 - 3.59)	P = 0.002
FVC (L)	1.81 (1.28 - 2.03)	3.57 (2.36 - 5.09)	P = 0.014
mMRC	3.00 (3.00 - 3.00)	0.00 (0.00 - 1.25)	P = 0.041
CAT	23.00 (22.00 - 26.25)	0.00 (0.00 - 2.50)	P = 0.035
SGRQ-C	70.90 (60.08 - 74.90)	4.77 (1.59 - 12.93)	P = 0.015
eHsp70	3.10 (1.78 - 3.56)	0.39 (0.25 - 0.69)	P = 0.010
<i>TLR2</i>	2.57 (1.55 - 3.74)	1.00 (0.77 - 1.18)	P = 0.064
<i>TLR4</i>	3.61 (2.87 - 4.13)	0.59 (0.49 - 0.93)	P = 0.001

COPD – chronic obstructive pulmonary disease; FEV₁ – forced expiratory volume in the first second; FVC – forced vital capacity; mMRC – modified Medical Research Council; CAT – COPD Assessment Test; SGRQ-C – St. Georges Respiratory Questionnaire; eHsp70 – extracellular heat shock protein 70; TLR – Toll-like receptor.

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