Increased serum concentrations of HSP 90 in patients with thymic epithelial tumors

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Disclosure slide

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Thymic Epithelial Tumors

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Orphan disease:

Thymic Epithelial Tumors (TETs)

TET Incidence: 0.2-1.5% of all malignancies\(^1\)

2-4 per 1,000,000

**BUT:** most common anterior mediastinal tumor in adults

*Myasthenia Gravis (MG)*

- 10-15% of MG patients have TETs
- 30-50% of patients with TETs have MG

Background – heat shock proteins (HSPs)

• Induced by different kind of stressors (heat, oxidative stress, hypoxia,...)

• Classified according to molecular weight
  \( \text{HSP100, HSP90, HSP70, HSP60, HSP40 and small HSPs (HSP27)} \) ¹

• Main functions
  1. Molecular chaperones: protein (re-)folding, transport, homeostasis
  2. Inhibition of apoptosis: extrinsic and intrinsic pathway

• HSPs in cancer -> associated with tumor growth, resistance to chemotherapy, metastases and poor clinical outcome ¹

¹ Khalil AA. et al. Heat shock proteins in oncology: diagnostic biomarkers or therapeutic targets? Biochem Biophys Acta (2011);1816:89-104
Heat shock protein 90 - Secretion

Freedom from recurrence

Cytoplasmic HSP27

Nuclear HSP70

Methods - HSP90alpha

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Study Population

- 58 healthy volunteers
- 114 patients with TETs: 86 thymomas and 28 Thymic Carcinomas
- 20 patients with benign thymic pathologies

ELISA tests for HSP90alpha
HSP serum concentrations in patients with TETs

Results (1)

Serum concentrations of HSP90 in TETS +/- MG

TETs(MG+): n=31  TETs(MG-): n=83
Results (2)

Serum concentrations of HSP90 in TETs vs. TH
Results (3)

Serum concentrations of HSP90 TC vs. Thymomas vs. TH

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Results (4)

HSP serum concentrations after complete surgical tumor resection

Pre OP
- One day before surgery

Post OP
- at least one month after surgery
- No sign of recurrence

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Summary

1. HSP90 is highly secreted in TETs (*marker for diagnosis*)

2. Strongest serum concentration of HSP90 was found in TCs (*tumor behaviour*)

3. Tumor resection $\rightarrow$ significant decrease of HSP90 serum concentrations (*Follow up*)

4. Elevated levels of HSP90 in myasthenia gravis (*Pathogenesis*)
Conclusions

The analysis of heat shock proteins in patients with thymic epithelial tumors warrants further study.