

# Recurrence of thymic tumors caused by heat-shock proteins

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In most cases, tumors of the thymus gland are removed by surgical resection. However, they recur after a few years in up to one third of patients. A research team headed up by thoracic surgeon Bernhard Moser of the Thoracic Surgery Department at MedUni Vienna has successfully demonstrated that these tumors form heat-shock proteins. The lower the concentration of these proteins, the more quickly tumors recur. The study has been published in the leading journal *Scientific Reports*.

Relatively little is known about the human [thymus gland](#), which sits in

the chest between the sternum and the heart. Its function is to form T-cells, which are used for specific immune defence and play an important role in the immune system. T-cells are predominantly developed in the body in the first ten years of life. After this point the thymus gland degenerates, its tissue is replaced by fat and it ceases to function as a gland.

Thymic tumors (thymomas and thymic carcinomas) can develop during the course of the degenerative process. Possible causes and risk factors are not yet understood. MedUni Vienna's Department of Thoracic Surgery treats approximately 30 such cases every year.

They are often diagnosed by chance in the course of scanning for other indications or in association with the diagnosis of myasthenia gravis, a neurological autoimmune disease that leads to muscle weakness. One in every ten such patients is also suffering from a thymic tumor, which is usually removed by surgery.

Working closely with pathologists (Ana-Iris Schiefer, Leonhard Müllauer), a team of [thoracic surgeons](#) (Bernhard Moser, Stefan Janik, Hendrik Jan Ankersmit, Walter Klepetko) has now investigated the role played by heat-shock proteins (HSP) in the formation of thymic tumors. Heat-shock proteins – or "stress proteins" as they are also known – are proteins that are formed when cells are exposed to high temperatures or other stress factors. These stress factors can also include infections. Heat-shock proteins stabilize cellular processes, thereby helping cells to survive under difficult conditions. Cancer cells make use of these proteins to form metastases and to develop resistance against chemotherapy treatments, amongst other things.

The study found the concentrations of [protein](#) measured in patients' blood decline significantly after complete resection of the tumor and that heat-shock proteins in tumors have prognostic significance. Stefan Janik:

"Heat-shock proteins are promising [tumor](#) markers for patients with thymomas and could be used in future to provide tailored cancer treatments for patients, for whom surgery is not an option. The study data were generated in the course of Stefan Janik's PhD thesis and were funded by the Christian Doppler Laboratory for Diagnosis and Regeneration of Cardiothoracic Diseases under the direction of Hendrik Jan Ankersmit.

Specialized thoracic surgeons at MedUni Vienna's Department of Thoracic Surgery perform operations in the region of the thymus gland, using the very latest invasive surgical methods, amongst other things. The treating physicians and surgeons or scientists are likewise conducting translational basic research with the aim of understanding the causes and risks of developing the disease and providing [patients](#) with the best possible treatment.

**More information:** S. Janik et al. HSP27 and 70 expression in thymic epithelial tumors and benign thymic alterations: diagnostic, prognostic and physiologic implications, *Scientific Reports* (2016). [DOI: 10.1038/srep24267](#)

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