

Summary

Molecular biology investigation of somatostatin receptors in diagnostics of pituitary tumors

The overwhelming majority of pituitary tumors are benign, with 25–30% of them representing clinically non-functioning pituitary adenomas (NFA). The treatment of choice for NFA is transsphenoidal neurosurgery. However, the procedure is often not completely successful and frequently tumor remnants remain, resulting in regrow over the long-term follow-up period. This fact has led to the development of new therapy strategies using pharmacological treatment: somatostatin analogs (SA) and estrogen receptor modulators. SA are effectively used in the treatment of acromegaly, neuroendocrine tumors and Cushing's disease. In contrast, pharmacological treatment of NFA has for the most part been unsuccessful. Low SA effectiveness could be associated with the variable expression of target receptors on the adenomas. The aim of the study was to determine the somatostatin (SSTR subtypes 1–5) and estrogen receptor 1 (ER1) expression profile. To obtain more complex receptor profile expression in the pituitary, we also investigated dopamin receptor 2 (D2R).

Methods

The group of patients was made up of 105 men and 101 women (20–87 years old; median 61). 144 samples were NFA, 44 growth hormone secreting (GHomas), 9 corticotrophin secreting (ACTHomas), 6 prolactin secreting (PRLomas) and 3 thyrotrophin secreting adenomas (TSHomas). The receptor expression was determined by quantitative real time PCR and the results obtained were normalized to the beta-glucuronidase housekeeping gene.

Results

We did not find any correlation between the receptor secretion profile and gender, age, tumor size or extension. Generally, the most expressed receptors in all adenoma types were D2R and ER1. Significantly high D2R expression was found in PRLomas and ACTHomas. The other receptor profiles were very heterogeneous.

Conclusions

Our molecular biology data on SSTR, ER1 and D2R revealed individual expression profiles. It demonstrates the extensive biological variability of the receptors in human's pituitary adenomas, with D2R and ER1 expression dominant. This fact makes treatment of NFA individual and very difficult. Determining the expression profile of receptors could serve to predict the SA dosage and increase the effectiveness of NFA treatment.