

Pituitary hormones and transcription factors immunohistochemistry¹

(Non-core)

Reason/Evidentiary Support

Standard immunohistochemical evaluation of pituitary adenomas includes specific anterior pituitary hormones (prolactin, growth hormone, follicle stimulating hormone, luteinizing hormone, thyroid stimulating hormone, adrenocorticotrophic hormone (PRL, GH, FSH, LH, TSH, ACTH, respectively) and/or pituitary transcription factors (PIT1, TPIT, steroidogenic factor 1/SF1).² Immunohistochemistry for these proteins, coupled with keratin (AE1/AE3 or CAM5.2) staining, for presence or absence of rounded cytoplasmic inclusions known as fibrous bodies, allows classification of adenomas for prognosis and medical treatment purposes. Antibodies directed against the pituitary transcription factor for corticotroph lineage adenoma (TPIT) are not as widely available as the other antibodies listed above.

For diagnostic purposes, some advocate first screening with three antibodies (PIT1, SF1, and ACTH) and then using the other anterior pituitary hormone assays based on initial results.³ Others utilise the full panel initially and may variably supplement the panel with additional reticulin histochemical stain and/or a cell cycle labelling marker (MIB1). There appears to be little, if any, utility for p53 immunohistochemistry.

The new WHO 2017 Classification system⁴ notes that: "Special adenoma subtypes that commonly show aggressive behaviour...include sparsely granulated somatotroph adenoma, lactotroph adenomas in men, Crouke cell adenoma and silent corticotroph adenoma, and plurihormonal PIT1-positive adenoma (previously called "silent subtype 3 adenoma").

For tumours of the posterior pituitary gland (granular cell tumour of the sellar region, pituicytoma, spindle cell oncocytoma), nuclear staining for the transcription factor TTF-1 is diagnostic.⁴

References

- 1 Lopes MBS (2017). The 2017 World Health Organization classification of tumors of the pituitary gland: a summary. *Acta Neuropathol*.
- 2 Nose V, Ezzat S, Horvath E, Kovacs K, Laws ER, Lloyd R, Lopes MB and Asa SL (2011). Protocol for the examination of specimens from patients with primary pituitary tumors. *Arch Pathol Lab Med* 135(5):640-646.
- 3 McDonald WC, Banerji N, McDonald KN, Ho B, Macias V and Kajdacsy-Balla A (2017). Steroidogenic Factor 1, Pit-1, and Adrenocorticotrophic Hormone: A Rational Starting Place for the Immunohistochemical Characterization of Pituitary Adenoma. *Arch Pathol Lab Med* 141(1):104-112.
- 4 Louis DN, Ohgaki H, Wiestler OD and Cavenee WK (eds) (2016). *WHO Classification of Tumours of the Central Nervous System, Revised. Fourth Edition*, IARC, Lyon.