

New immunohistochemistry stains at Douglass Hanly Moir Pathology

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Introduction

Immunohistochemistry (IHC), a vital tool in surgical pathology, is useful in its versatility and reliability. It can determine the origin of unknown tumours. Stains can provide insights into the characteristics of tumours, as well as help to determine the most effective treatment method for the patient.

This presentation examines a selection of recently introduced antibodies in use at DHM. The purpose of the poster is to provide a brief outline for each of the stains, coupled together with an example of each stain and their accompanying Haematoxylin and Eosin (H&E).

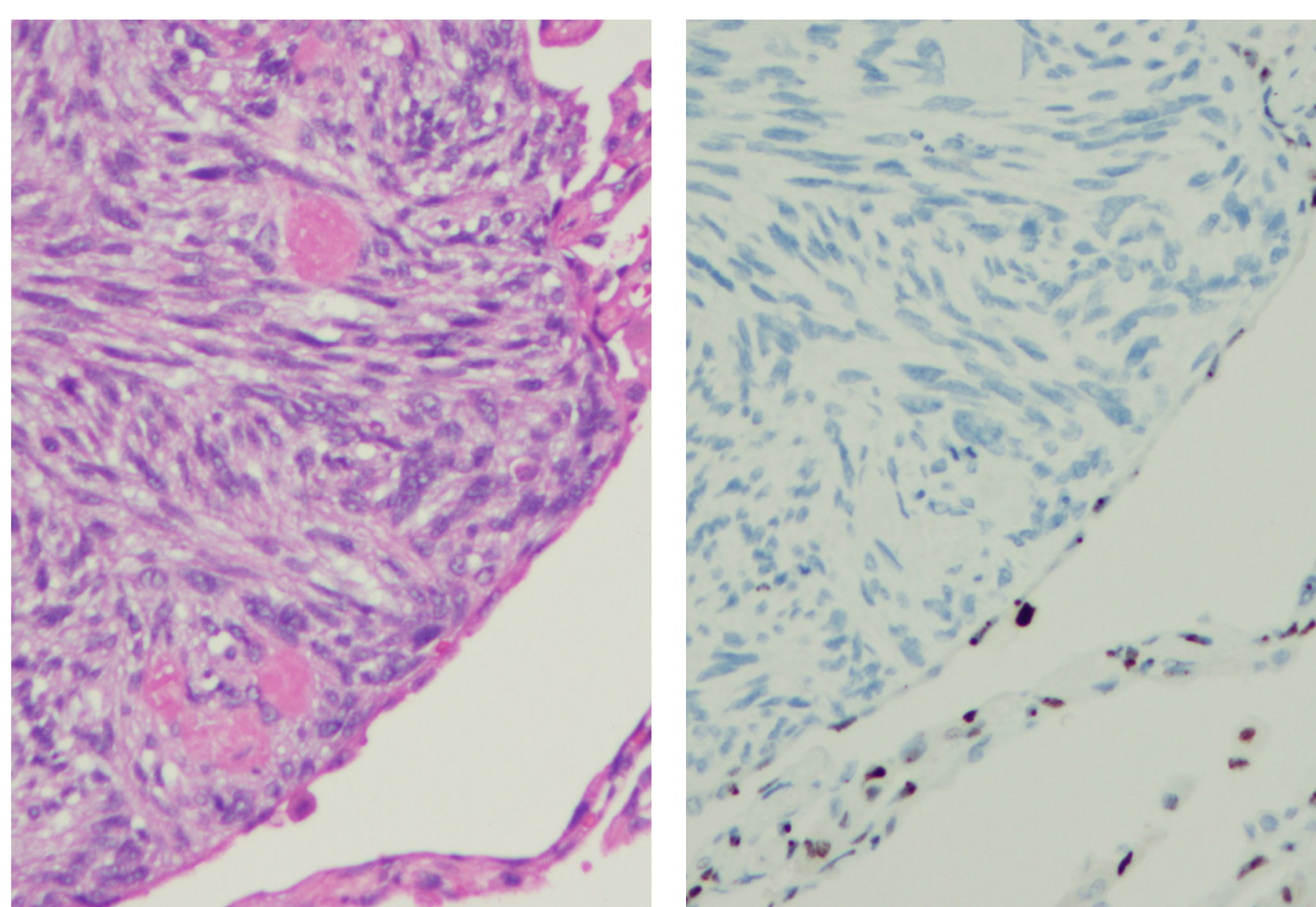


Figure 1. H&E and H3K27me3 IHC stain of malignant peripheral nerve sheath tumour.

H3K27me3 – Nuclear

- Shows the H3K27 tri-methylation activity within cells.
- Most tissue will stain positive for H3K27Me3.
- A negative stain indicates a lack of genetic regulation within the cells of the tumour.
- Loss of this methylation has been shown as a good distinguisher of malignant peripheral nerve sheath tumour (MPNST).
- Important for determining the particular treatment for the patient.

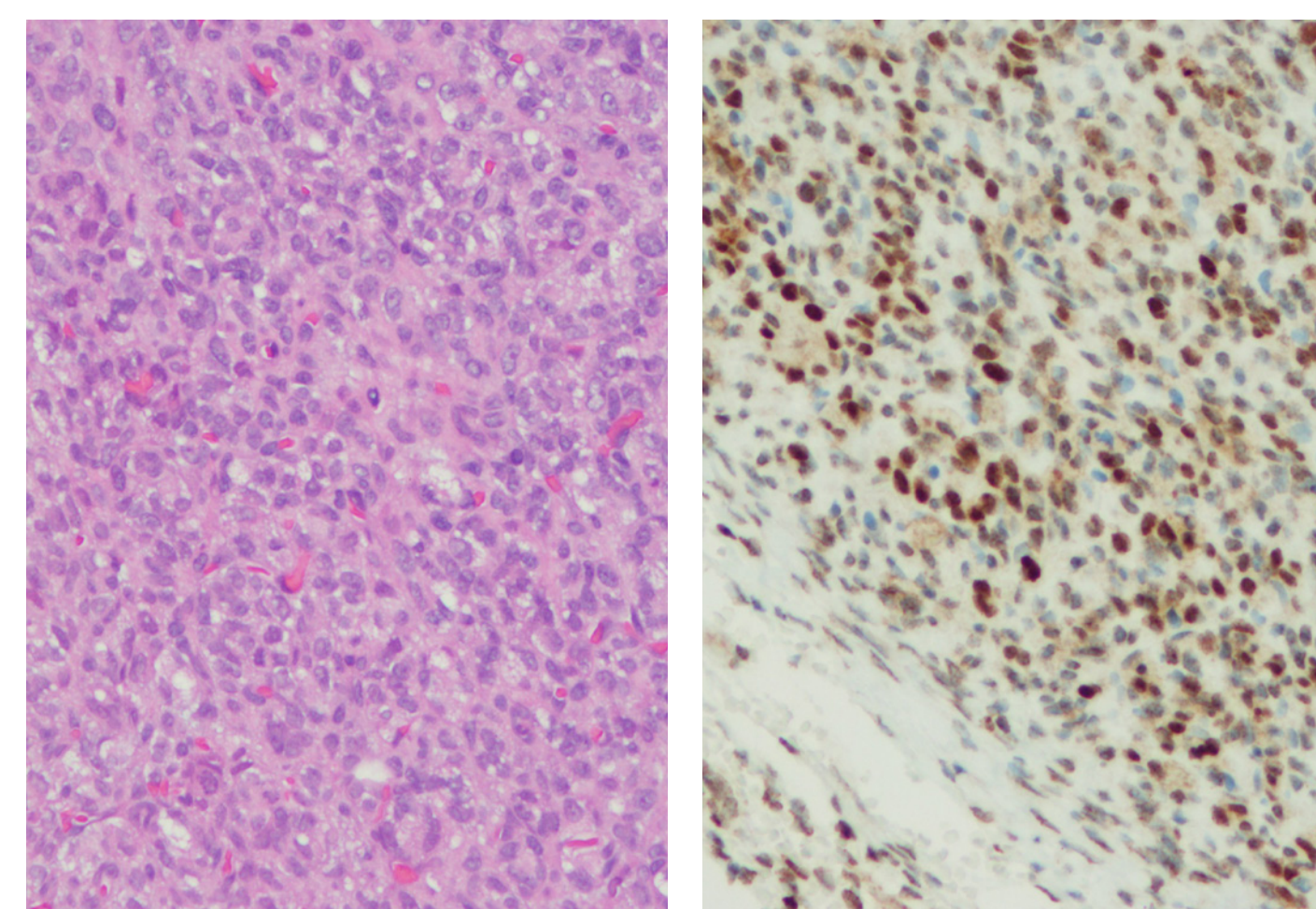


Figure 4. H&E and Steroidogenic Factor 1 IHC stain of sex cord stromal tumour.

Steroidogenic Factor 1 (SF-1) – Nuclear

- Key regulator reproductive development biosynthesis of a variety of hormones
- Antibody will stain positive in normal Testis, Ovary and Thymus tissue lysates.
- Useful for the differential diagnosis of endometrioid tumours and carcinoid of the testis and ovary.
- SF-1 is a sensitive and specific IHC marker and that SF-1 is diagnostically comparable with other sex cord-stromal markers.

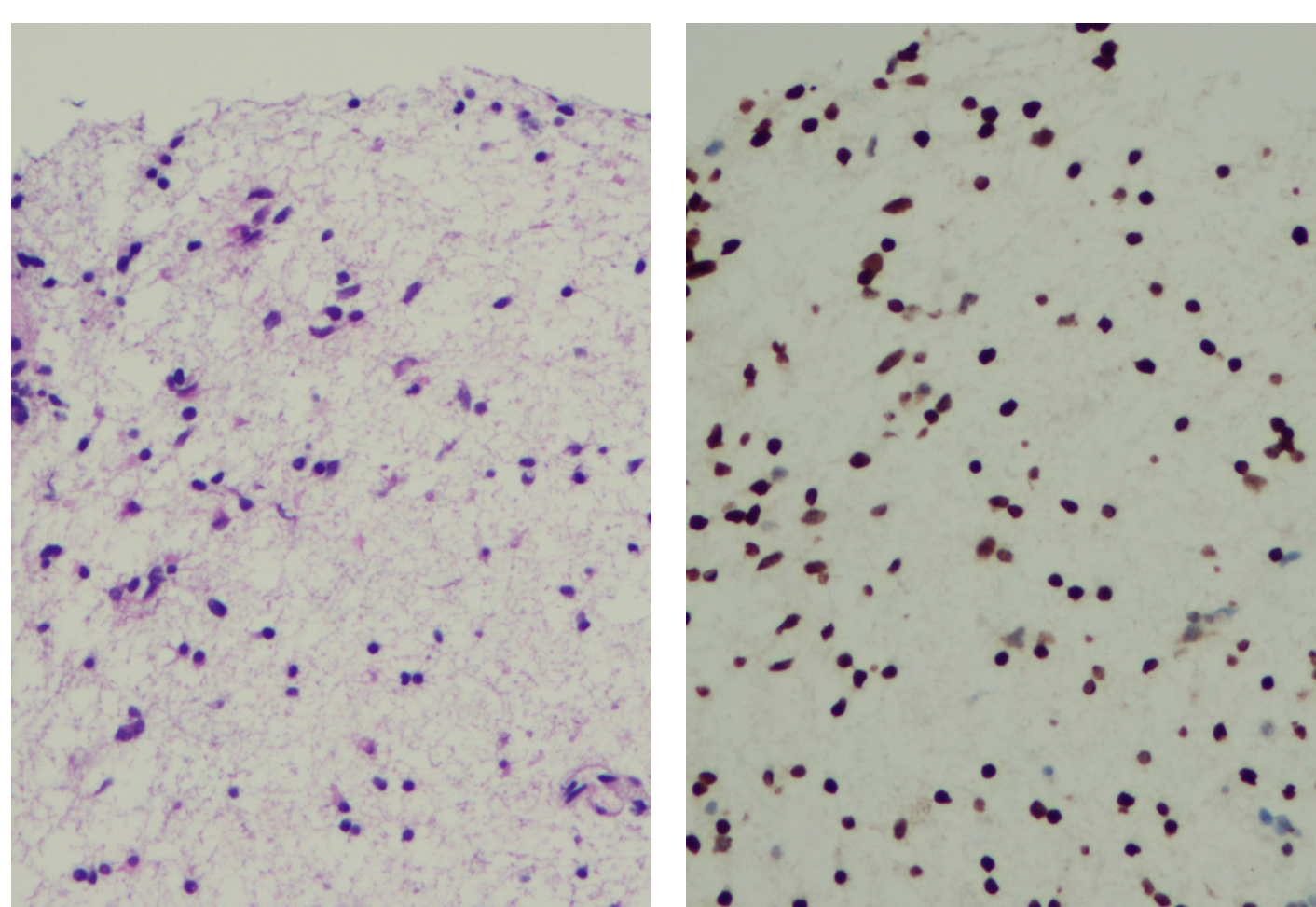


Figure 2. H&E and H3K27 mutant IHC stain of high-grade juvenile glioblastoma.

H3K27 Mutant – Nuclear

- Indicates the presence of a K271 mutation in the H3F3A histone.
- This gene locus is responsible for regulation of the polycomb repressor complex 2 (involved in gene expression).
- Found in midline brain tumours and most high-grade juvenile glioblastomas.
- Important prognostic marker (tumours are difficult to treat with conventional methods).

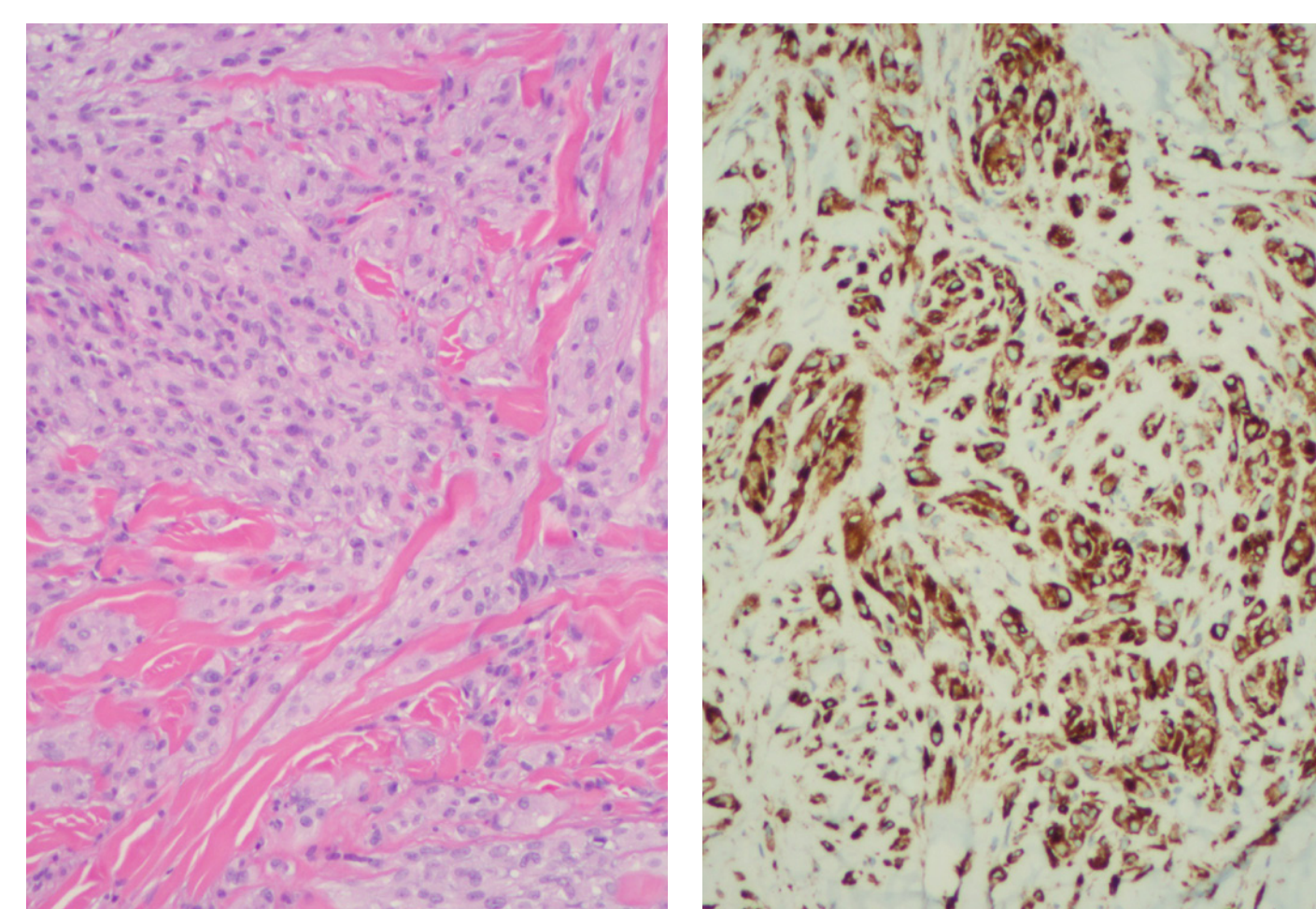


Figure 5. H&E and NKI/C3 IHC stain of neurothekeoma.

NKI/C3 – Cytoplasmic and membranous

- Targets melanoma-associated antigen (ME491) found in a variety of cell types.
- ME491 is involved in organising cellular signalling motility and migration and is found in high levels in the early stages of some tumours.
- Useful in melanomas and neurothekeomas.
- Shown to help differentiate renal oncocytoma from other renal cell carcinomas.

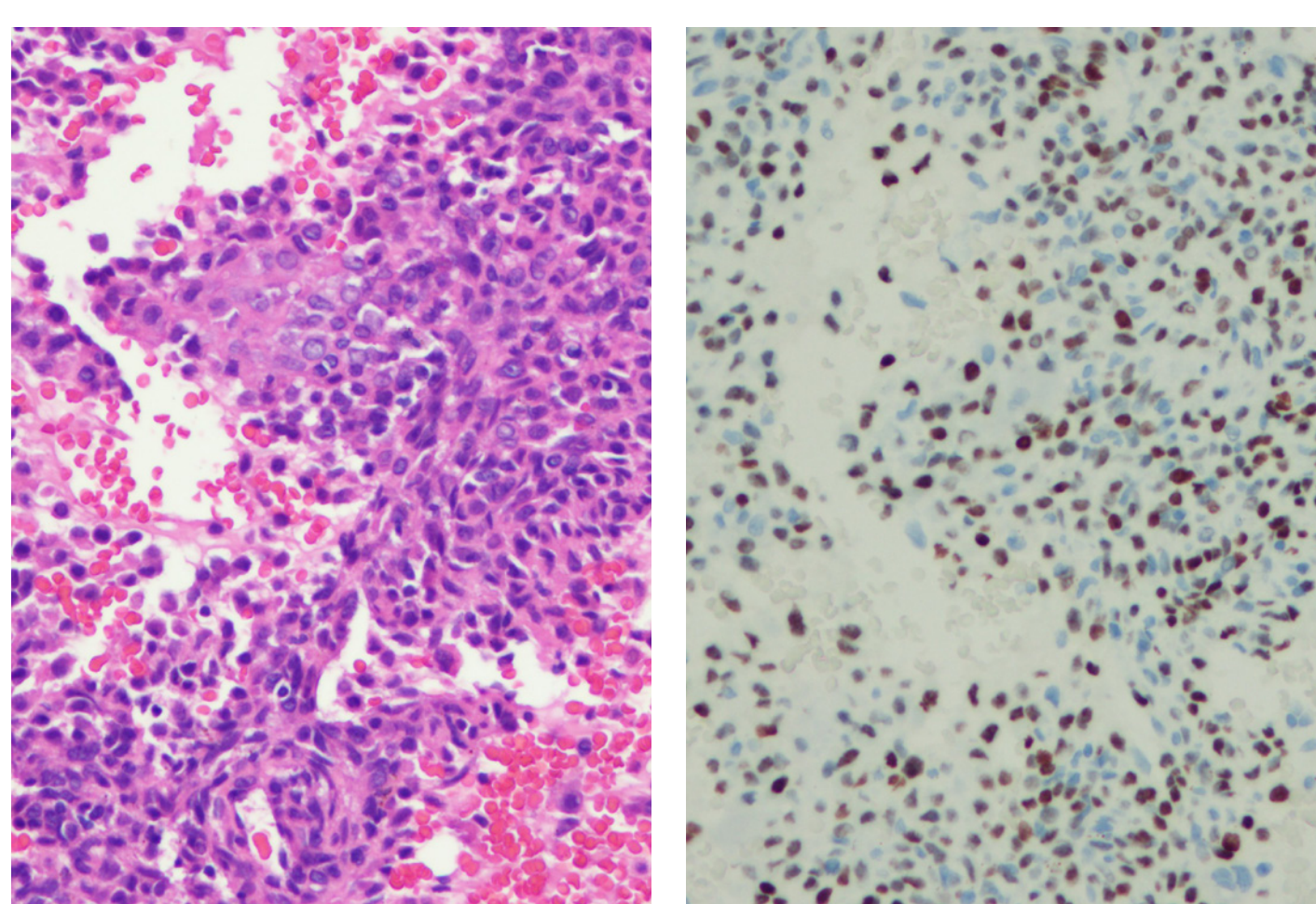


Figure 3. H&E and H3K36m IHC stain of chondroblastoma.

H3K36m – Nuclear

- Targets the expressed protein of a K36M mutated gene, responsible for RNA processing and detecting damaged DNA sequences.
- Antibody is a highly specific marker for chondroblastoma as most contain this mutation.

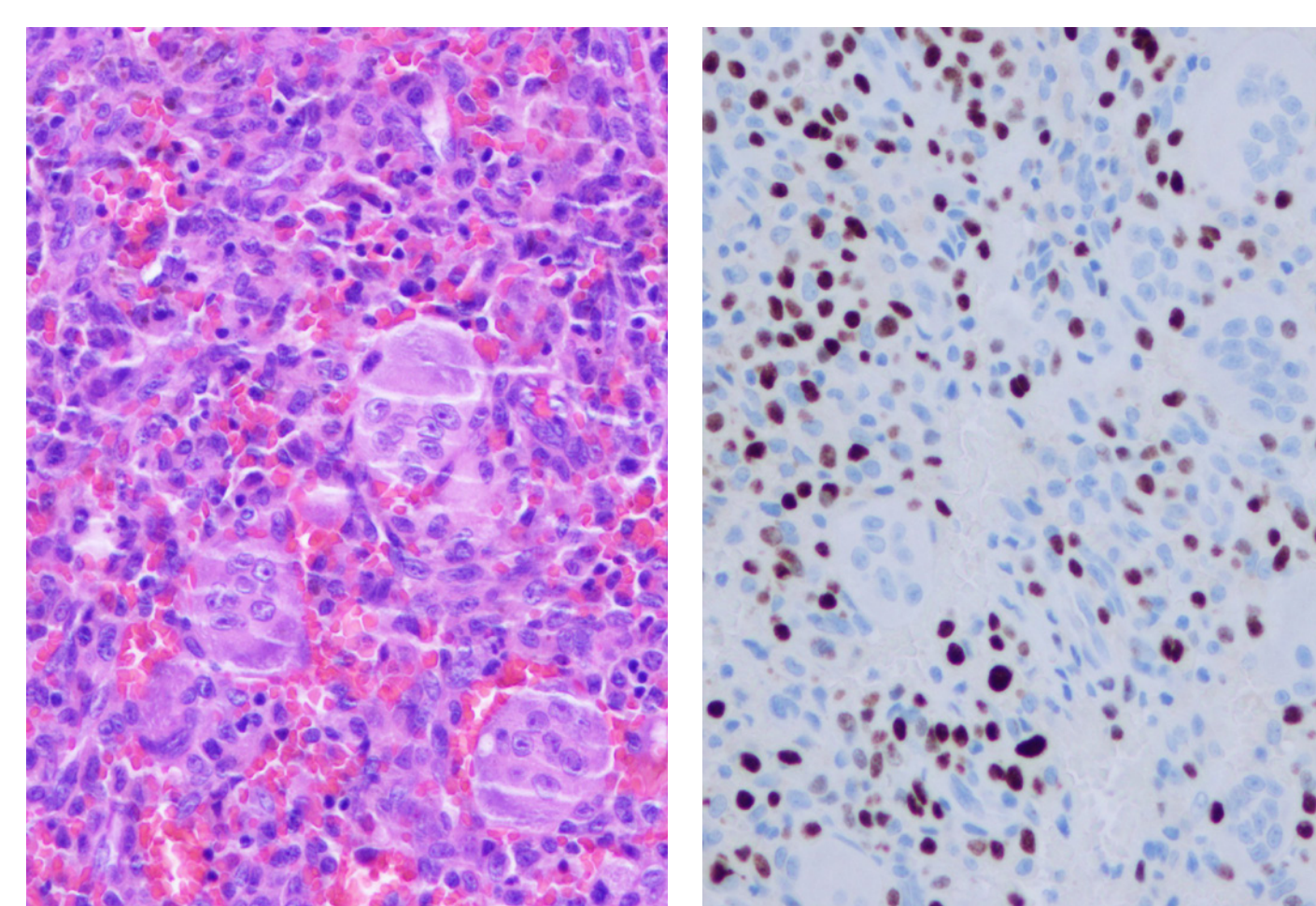


Figure 6. H&E and H3.3 G34W IHC stain of giant cell tumour.

H3.3 G34W – Nuclear

- Anti-histone H3.3 G34W antibody is highly specific and sensitive for tumours harbouring this mutation.
- Mutations in H3.3 G34W are characteristic of giant cell tumour of bone (GCTB).
- GCTB is a locally aggressive subarticular tumour.
- Anti-histone G34W antibody is a valuable tool for supporting a diagnosis of GCTB and distinguishing GCTB from its mimics.

Conclusion

IHC stains provide reliable evidence towards diagnosis; however they should always be assessed in conjunction with other histological features. As more specific stains are developed, it is important to select and use the appropriate control tissue. Diagnostic IHC will continue to evolve. More applications of IHC are constantly being developed. IHC is also repeatedly improving on its accuracy.

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