

NEUROENDOCRINE NEOPLASMS (NEN)

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WHO 2017 Endocrine Organs and WHO 2019 Digestive systems. Neuroendocrine Neoplasms (NEN) includes Neuroendocrine tumor (NET), Neuroendocrine carcinoma (NEC), Neuroendocrine carcinoma (MiNEN), Mixed neuroendocrine-non-neuroendocrine neoplasm (MiNEN). WHO 2019 uses Ki-67 for grading NET (G1, G2, G3) and NEC (Small cell type, Large cell type). MiNEN includes NEC and NET. WHO 2021 Thoracic Tumours includes NET (G1, G2, G3) and NEC (Small cell type, Large cell type). TNM staging is used for NET and NEC. NEN includes WHO 2019 and WHO 2021 categories.

NEUROENDOCRINE NEOPLASMS (NEN)

WHO 2021 Thoracic Tumours includes NET (G1, G2, G3) and NEC (Small cell type, Large cell type). TNM staging is used for NET and NEC. NEN includes WHO 2019 and WHO 2021 categories. Reference: Albertelli M, et al. Front Endocrinol (Lausanne). 2021; 12: 680305.

1 WHO

WHO2010 ¹⁰ Digestive systems	WHO2017 ²⁰ Endocrine Organs	WHO2019 ³⁰ Digestive systems
Neuroendocrine tumour NET G1/G2	Neuroendocrine tumour NET G1/G2/G3 well-differentiated NEN	Neuroendocrine tumour NET G1/G2/G3 well-differentiated NEN

Neuroendocrine carcinoma NEC G3 large cell or small cell type	NEC G3 large cell or small cell type poorly differentiated NEN	NEC G3 large cell or small cell type poorly differentiated NEN
Mixed adeno-neuroendocrine carcinoma MANEC	Mixed neuroendocrine-non-neuroendocrine neoplasm MiNEN	Mixed neuroendocrine-non-neuroendocrine neoplasm MiNEN*
Hyperplastic and preneoplastic lesions		

NEC MANEC MANEC

2 NEN WHO 2019

		Grade	cells/ 2mm ²	Ki-67 ^b
NET	NET G1	Low	≤2	≤3%
NET	NET G2	Intermediate	2-20	3-20%
	NET G3	High	≥20	≥20%
NEC	Small cell type (SCNEC)	High ^c	≥20	≥20%
	Large cell type (LCNEC)		≥20	≥20%
	MiNEN	Variable ^d	Variable ^d	Variable ^d

a. Count cells in 0.2mm² × 50 fields in 10mm² area or in 2mm² × 10HPF × 40× field (0.5mm × 0.5mm)

b. Ki-67 staining in 500 cells in Grade 1-2 Ki-67 staining in 500 cells

c. NEC grading high-grade

d. MiNEN NE NE NE NEC

MiNEN NE NE grading

3 NEN WHO 2021

		cells/ 2mm ²	
	5mm	≤2	
		2-10	

