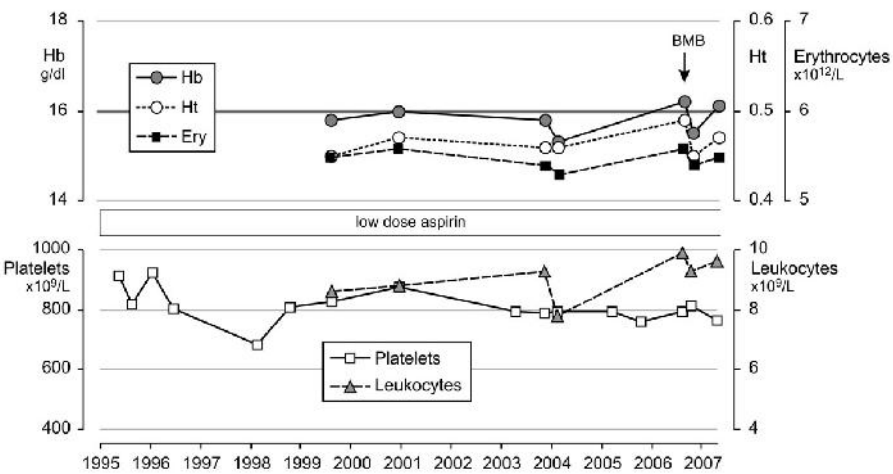


Figure 1. Hannover Bone Marrow Classification of MPD by Georgii et al 1990 versus PVSG (Berlin 1975, 2008 WHO (Swerdlow et al 2008) and 2013 WHO CMP criteria (Michiels et al 2013,2015) for prefibrotic JAK2 positive ET, PV and ET.MGM and MF (red), versus CALR mutated primary megakaryocytic granulocytic myelodysplasia (PMGM, blue) and fibrotic stages of MPN (black) or MPN unclassifiable (brown).

Bone marrow alone Georgii 1990	ET	PV	ET prefibrotic PMGM	Fibrotic PMGM		
Thiele 1988-2002 PVSG→ 2001 WHO 2008 WHO	True ET MF 0 ET	PV PV	ET prefibrotic PMF MF 0/1	Fibrotic MF		
PVSG ↓ translatio	ET ↓	PV PVSG	↓	Fibrotic MF		
2008 WHO-ECMP	3 stages of ET		Hypercelluar ET			
2008 WHO-ECMP Red JAK2 ^{V617F} Blue CALR normocellular	ET stage1 prodromal PV	PV ET.MGM	ET stage3 CALR-PMGM	Fibrotic MPN Post ET MF, post-PV MF		
Bone marrow Michiels et al Cellularity %	ET picture <60	ET/PV picture 60-80 prodromal PV	PV picture 80-100	ET.MGM → CALR-ET 60-80-100 → 80-100		
Megakaryocytes	Mature MPL	Pleomorph	Pleomorph	Dysmorphi nucleci	CALR-PMGM Cloudy nuclei	MPN-UC: Dysmorphic Megakaryocytes
Enlarged/clusters	↑ ↑ ↑	+ / ↑	+ / ↑ ↑	+ / ↑ ↑	+ / ↑ ↑	+ / ↑ ↑
Erythropoies	N / N N	↑	↑ ↑	N / ↓	↓ / ↓ ↓	↓ ↓
Granulocytosis	N / N N	N / ↑	↑ ↑	↑ ↑	↑ ↑	↑ ↑
Erythrocytes N = <6x10 ¹² /L	N / N N	N<6x10 ¹² /L	>6x10 ¹² /L	N	N	↓
Platelets >400 x10 ⁹ /L	+ / + ++	+	+	+	>1000	+ / -
JAK2 ^{V617F} 2005	+ / - neg	+	+ / ++	- / + / ++	negative	JAK2 / MPL / CALR

Conclusion: for clarity the WHO-ECMP MPN classification and staging separate JAK2V617F positive classical trilinear PV and ET stage 1, 2 and 3 (in red) versus JAK2 wild type (blue) ET stage 3 = PMGM, and fibrotic endstage of PMF

Figure 2. JAK2V617F positive essential thrombocythemia (ET) with long-term stable ET and ET bone marrow features 1996-2014



JAK2V617F positive ET with PV bone marrow features in 1997, who developed PV in 2004-2005 followed by a complete hematological response on interferon

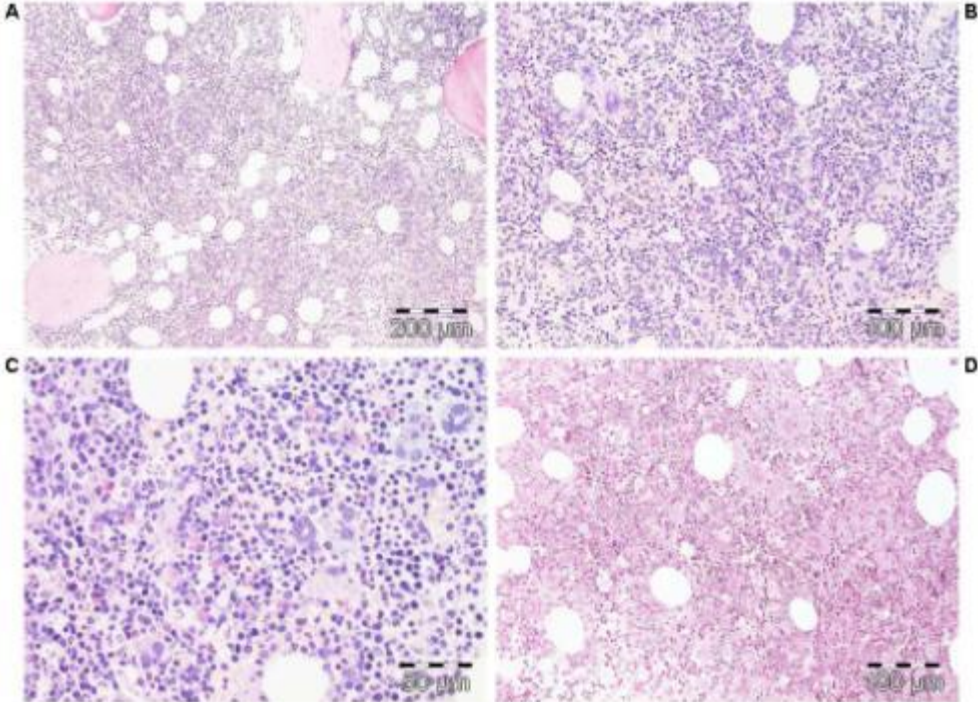
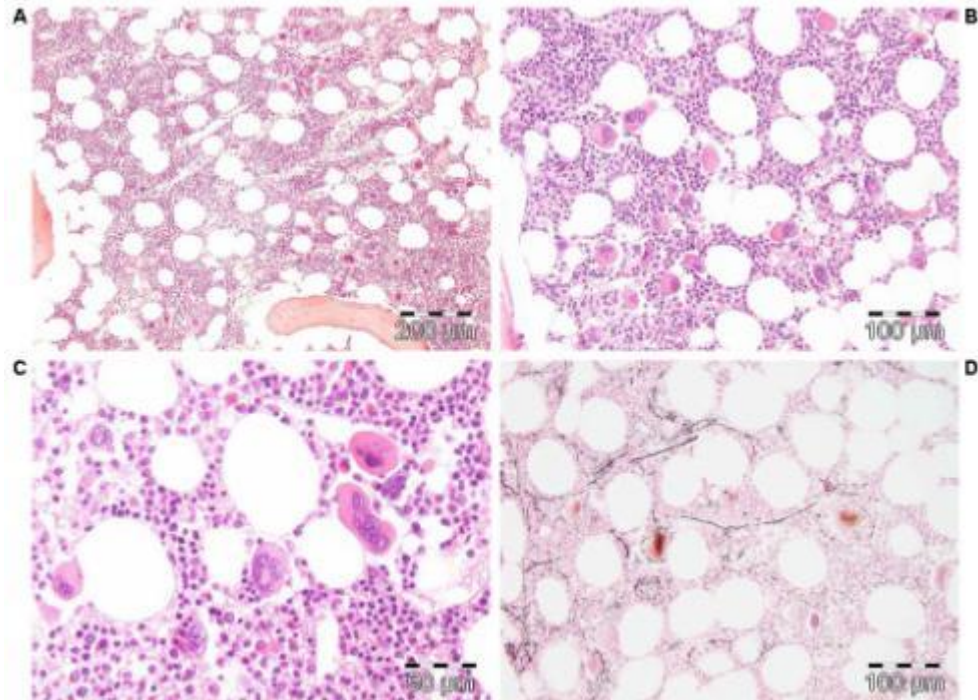
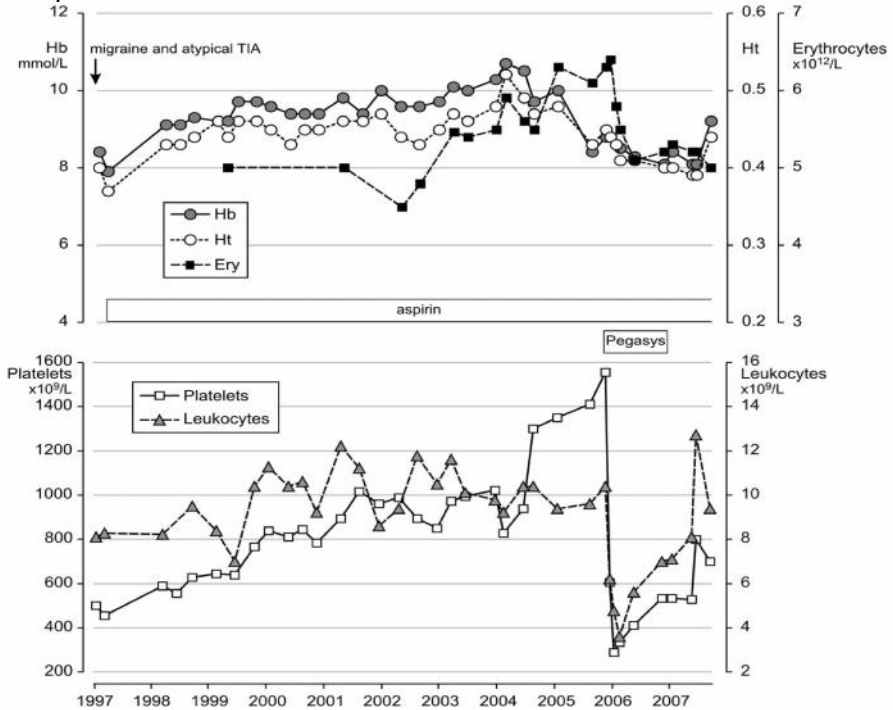
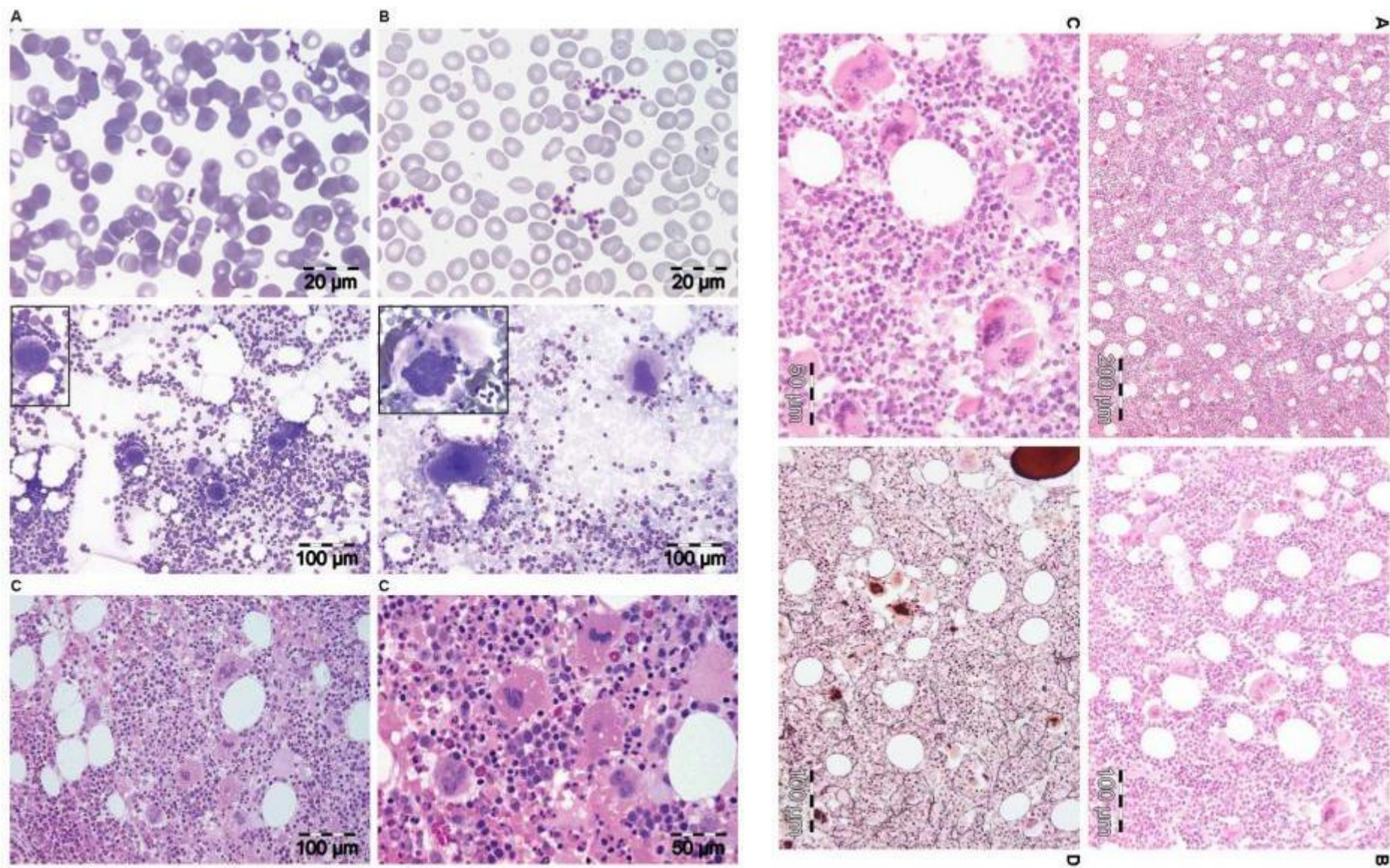


Figure 3.



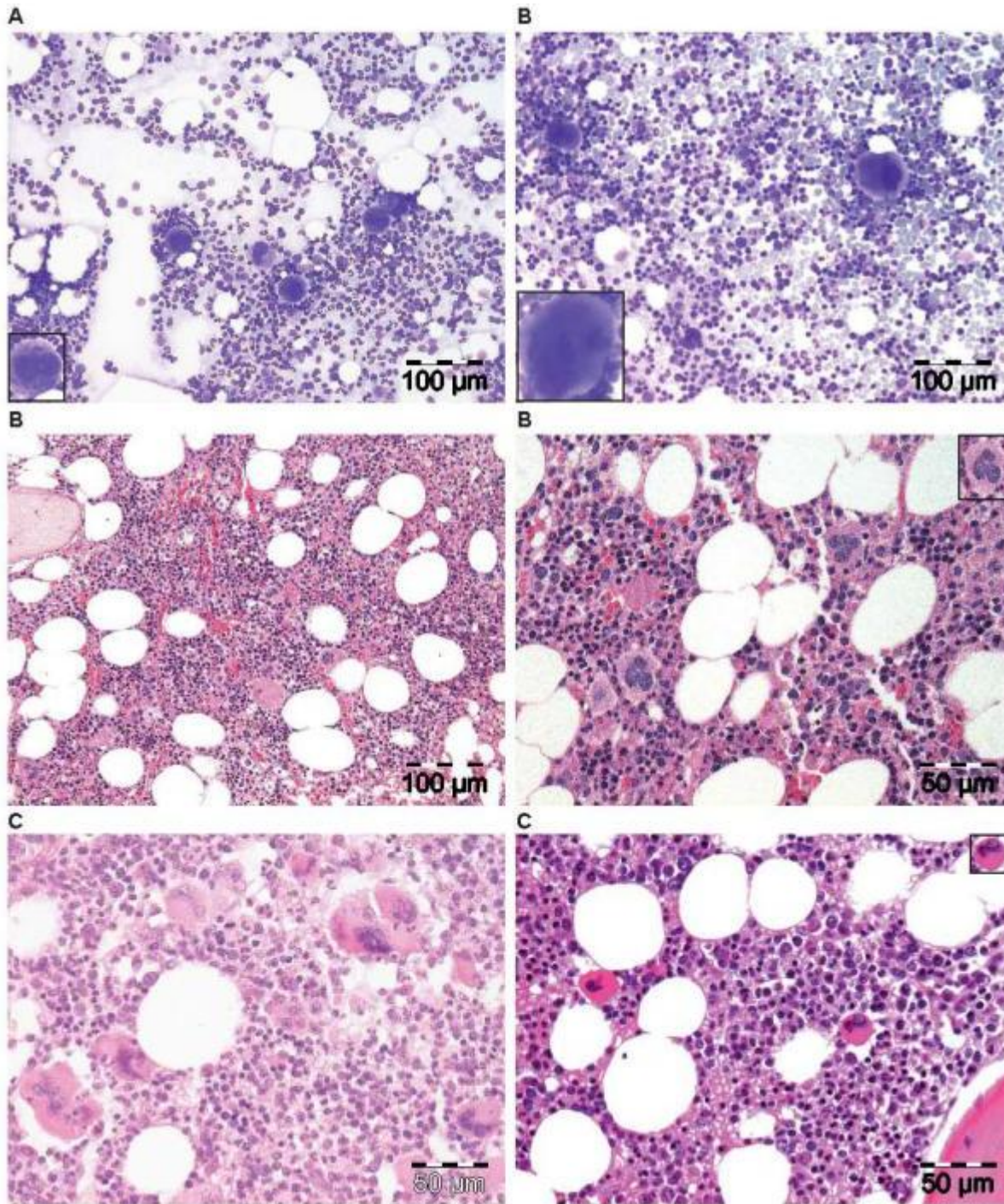


Figure 4.

Figure 5.
JAK2 exon 12
PV

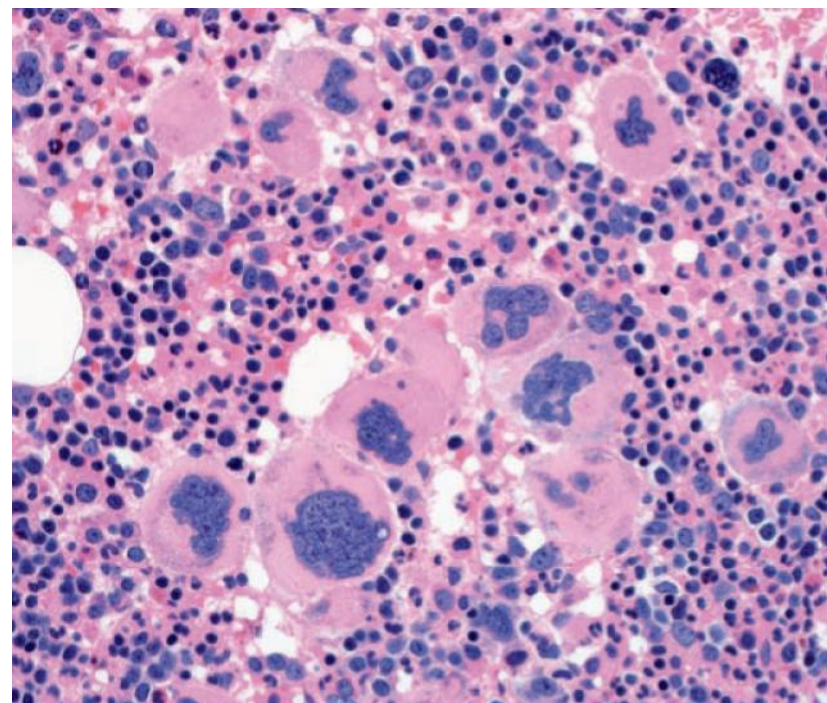
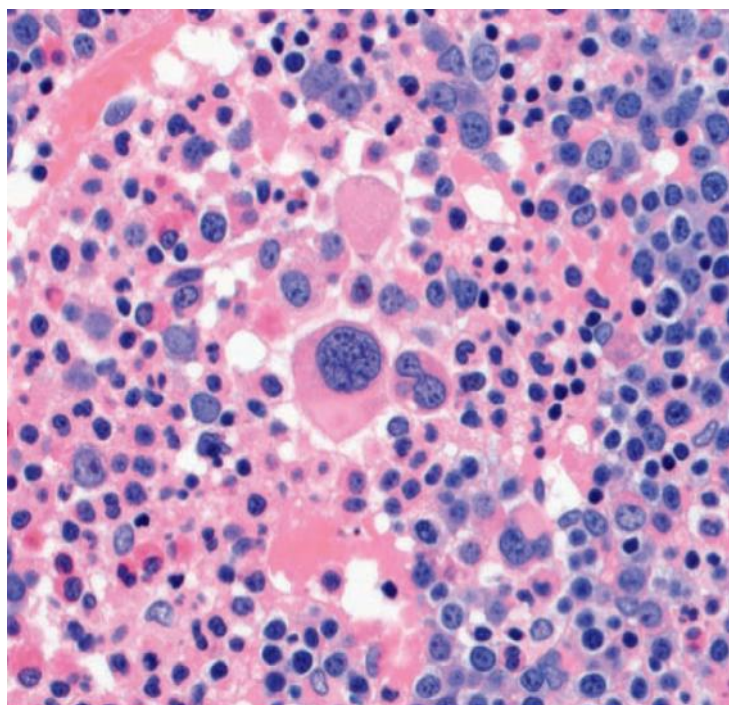
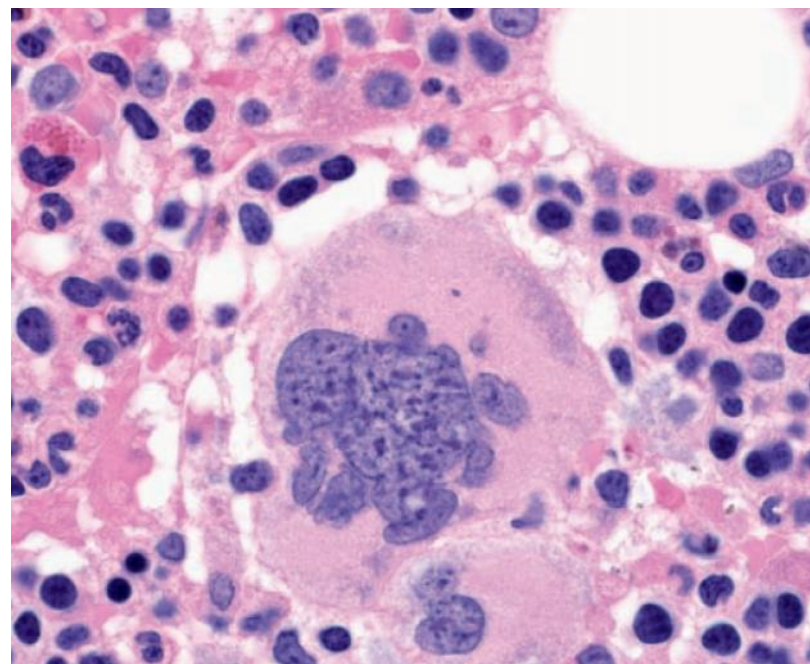
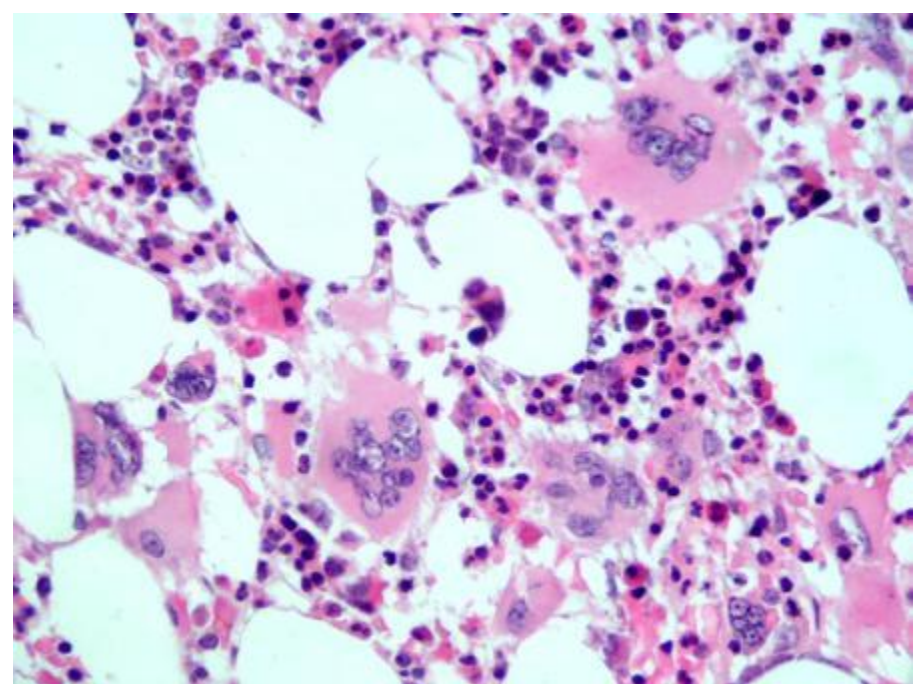
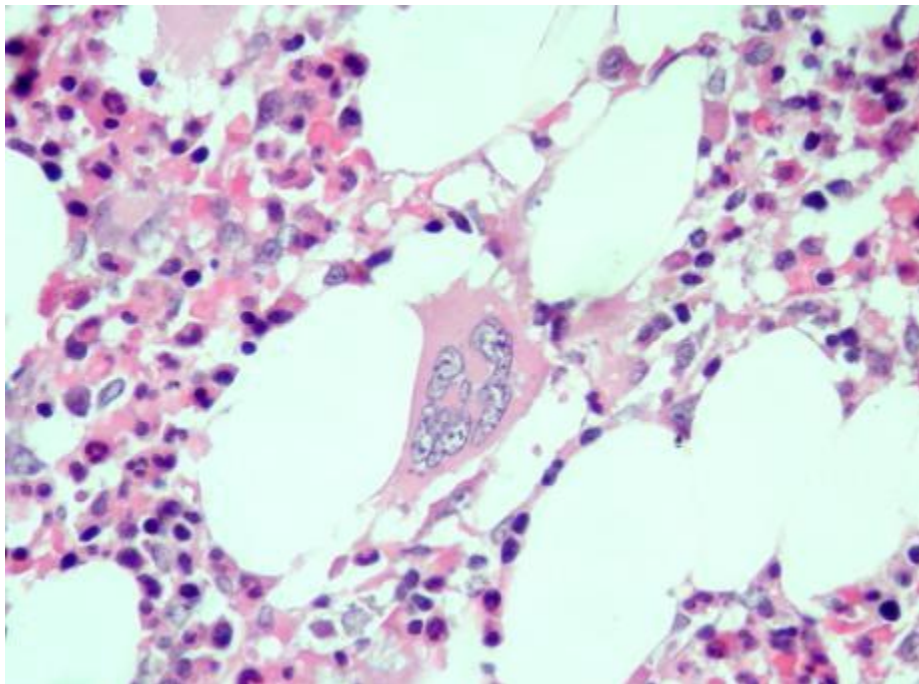
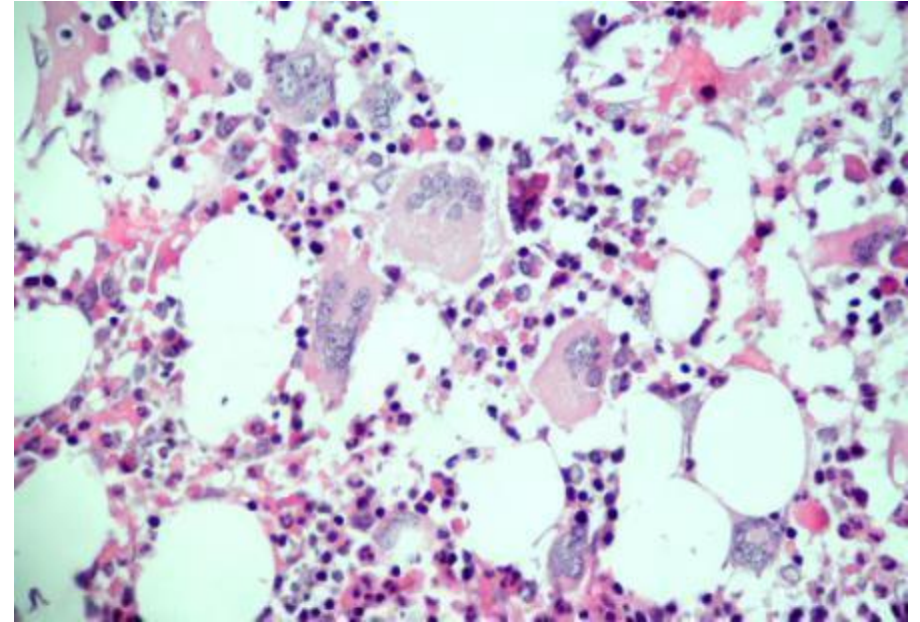
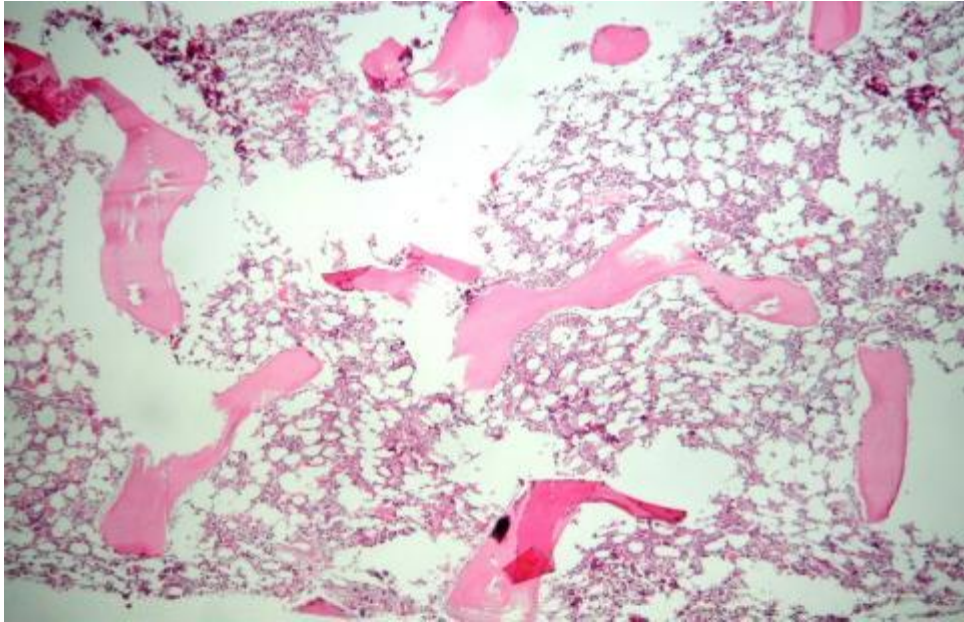


Figure 6.



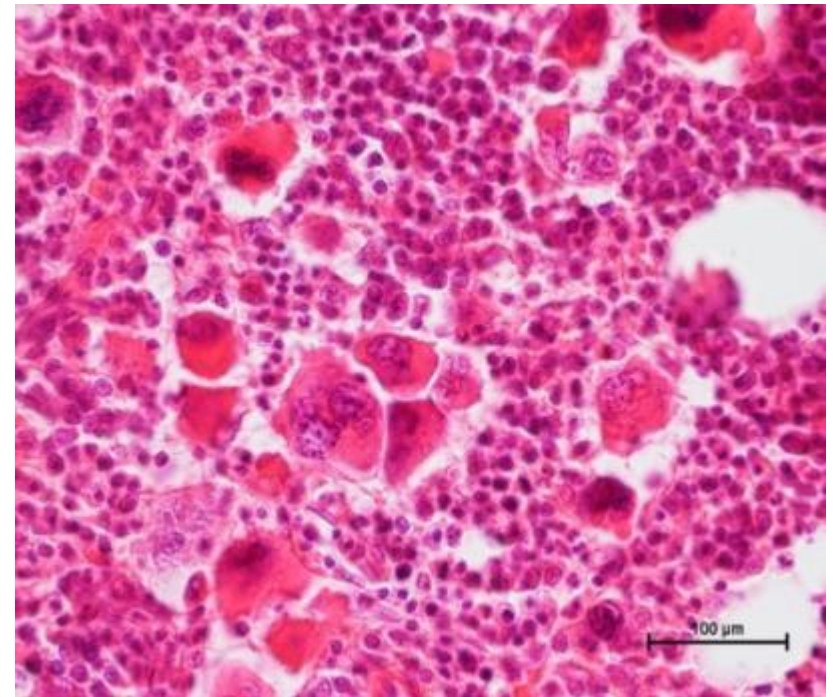
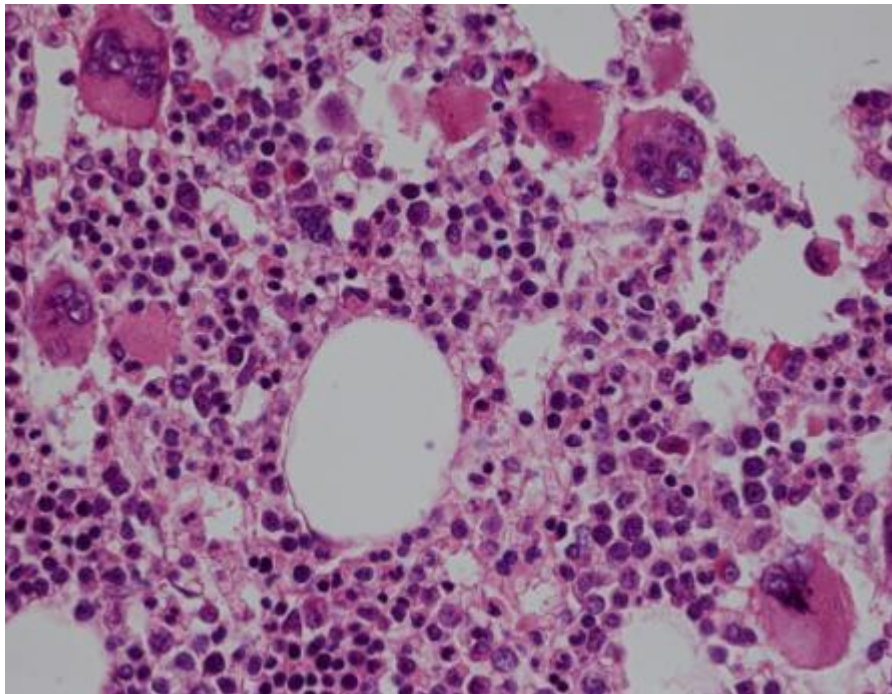
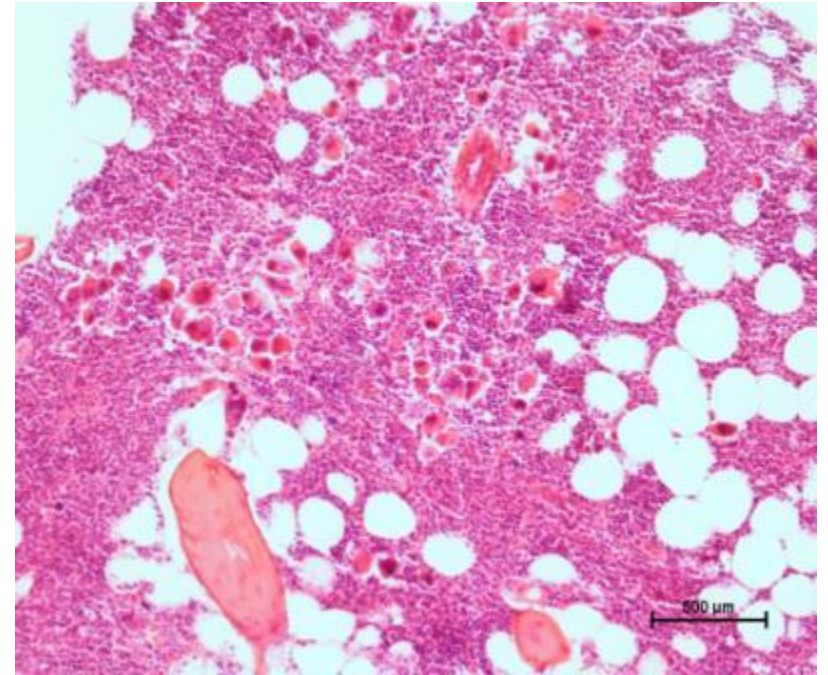
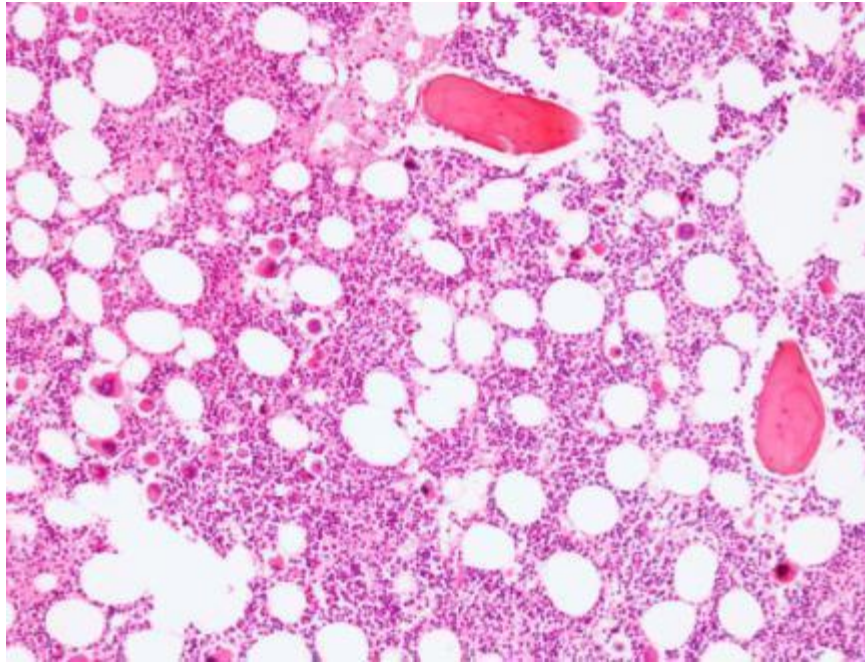


Figure 8. WHO-CMP Classification of five distinct clonal Myeloproliferative Neoplasms (MPNs) and Transitional states

