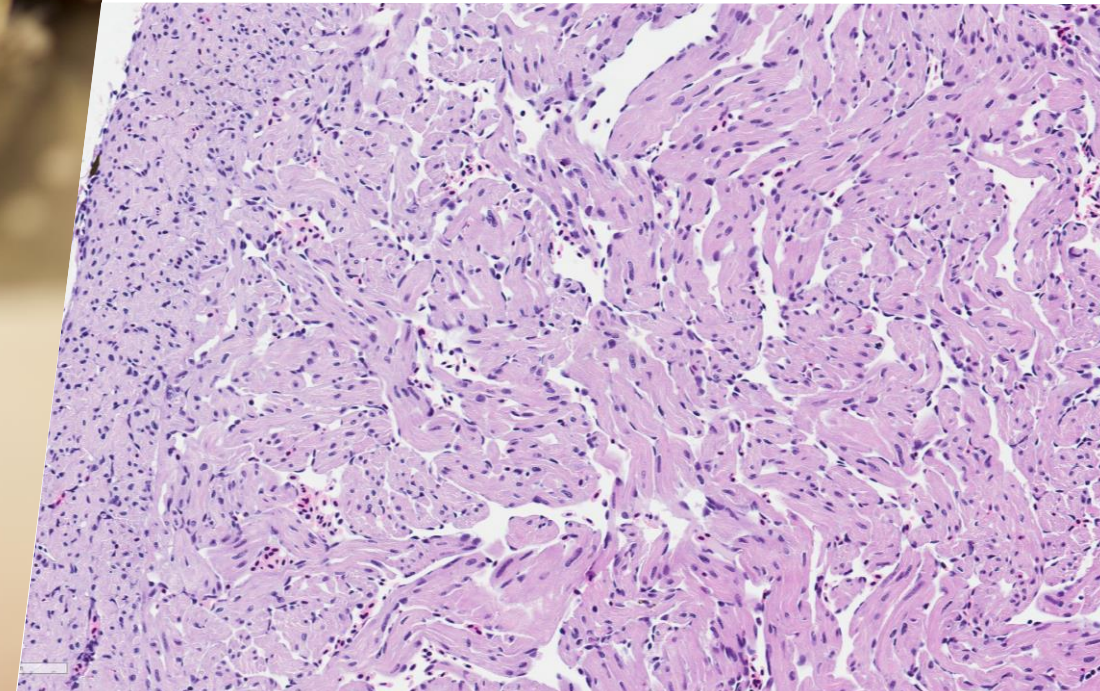
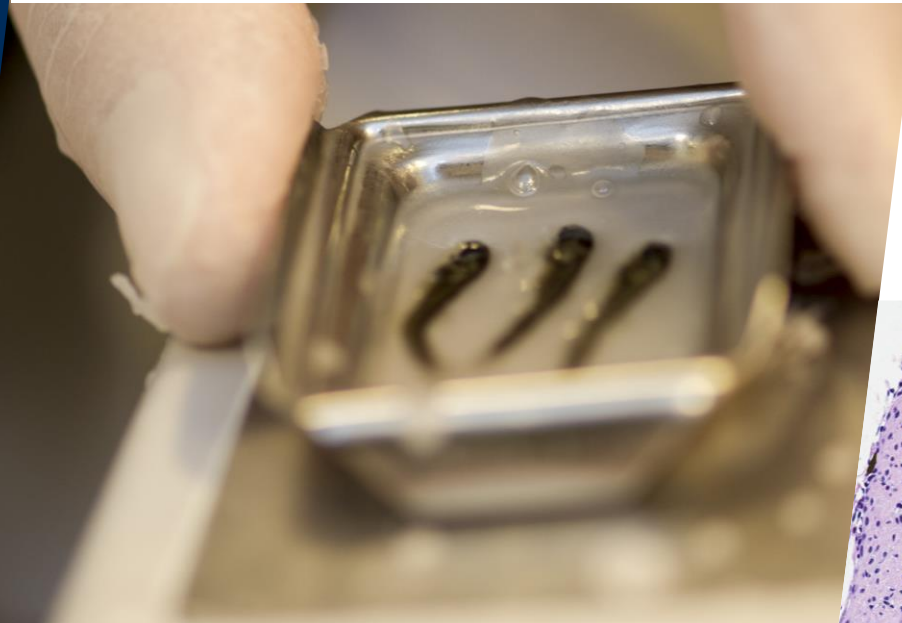




FishVet Group

Concurrent infections with PD, CMS and HSMI: experiences from diagnostic histopathology

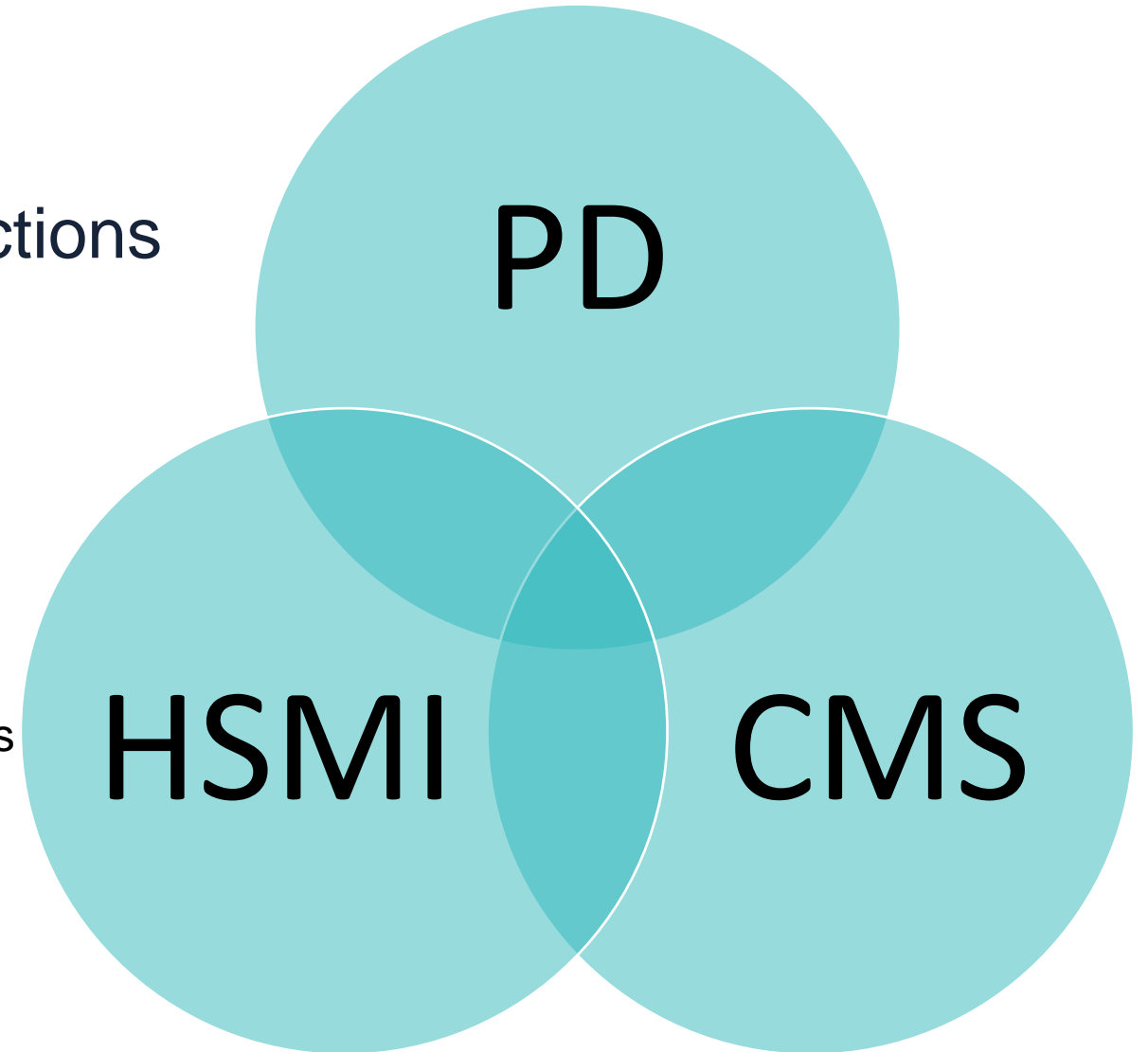
MARIANNE KRAUGERUD DVM PHD DIPL
ECVP



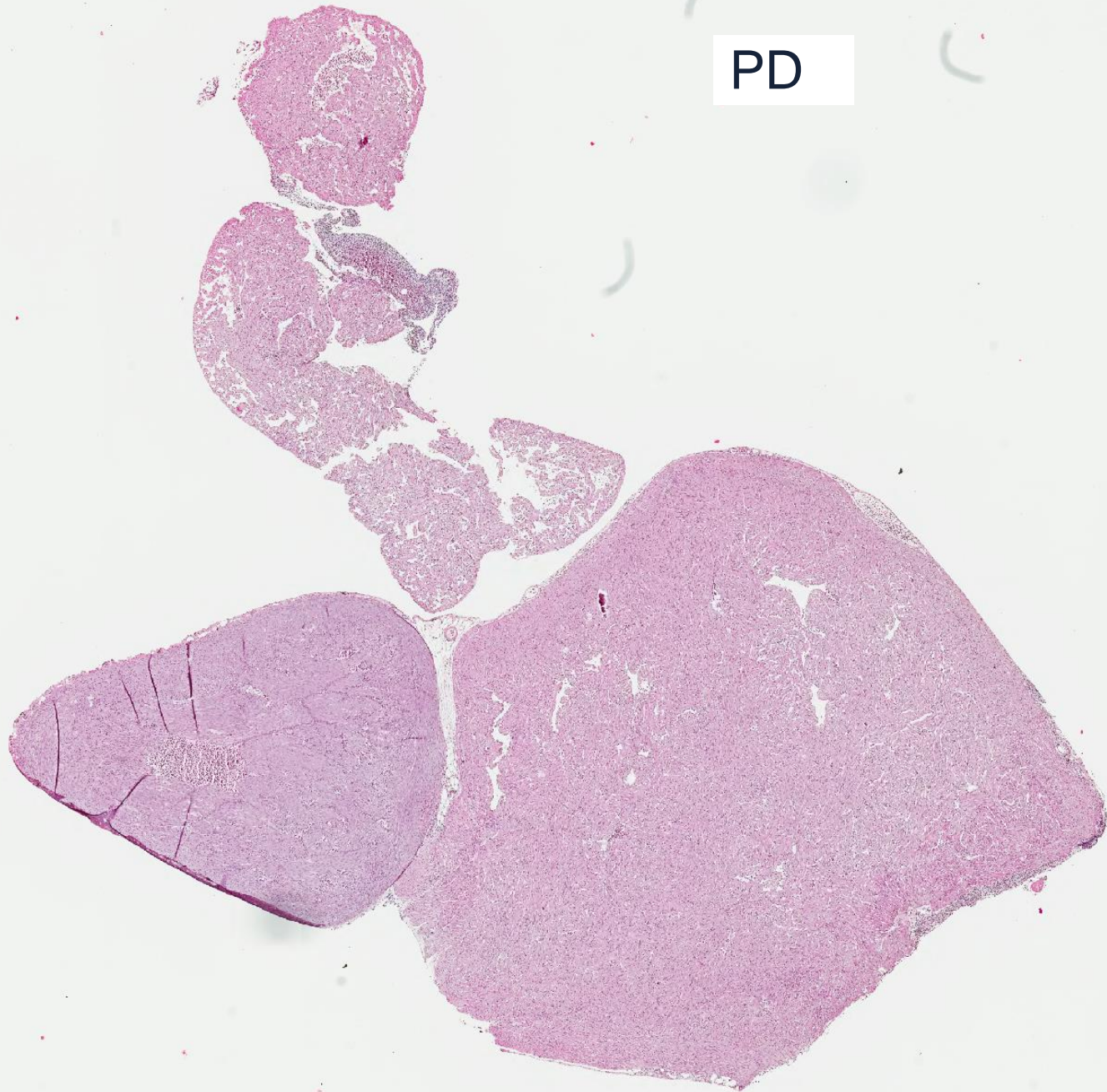


Challenges with co-infections

- Overlapping pathology
- Often no corresponding PCR
- PCR is not always helpful
- Immunohistochemistry is not always helpful

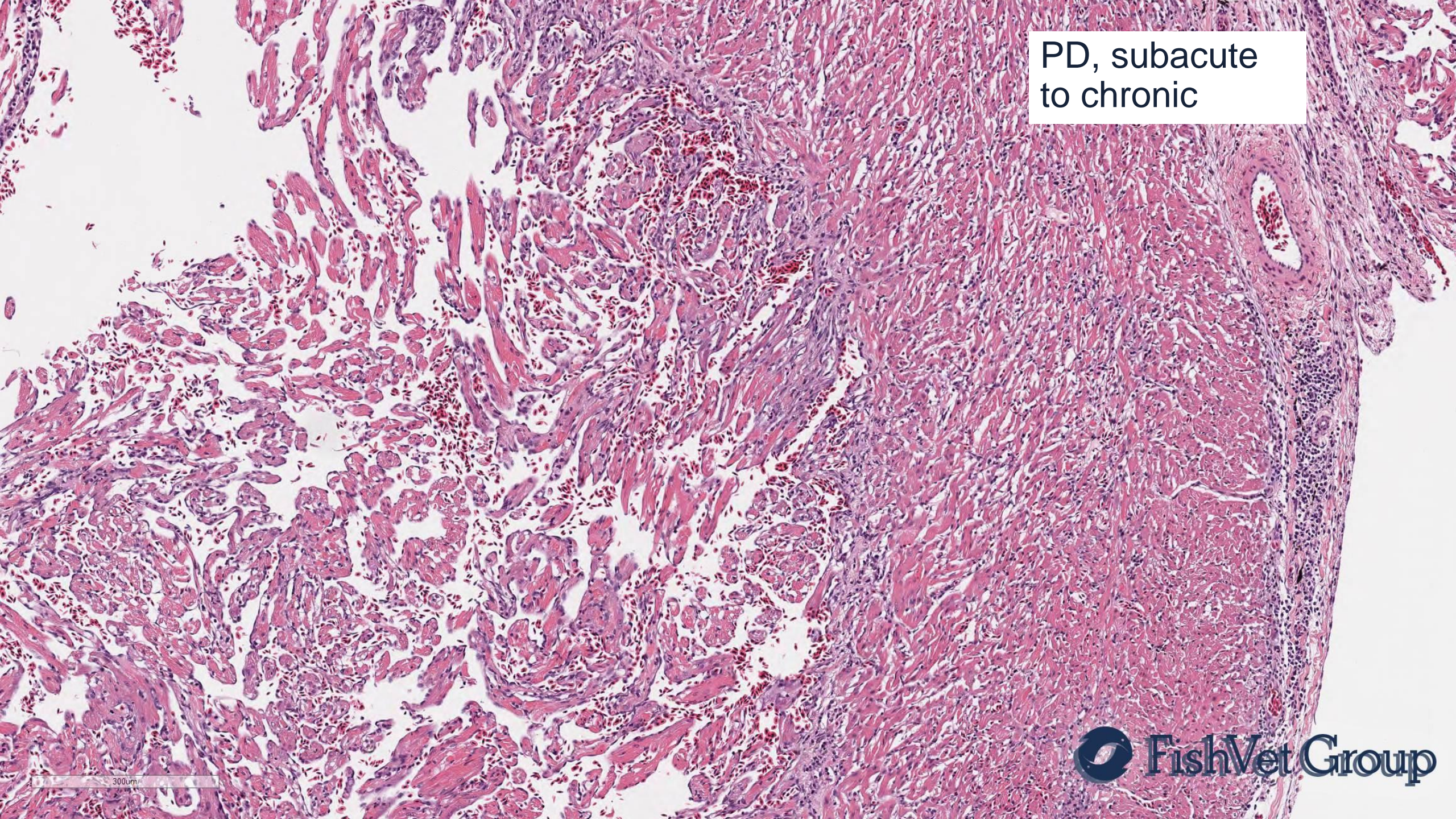


PD



2mm

PD, subacute
to chronic

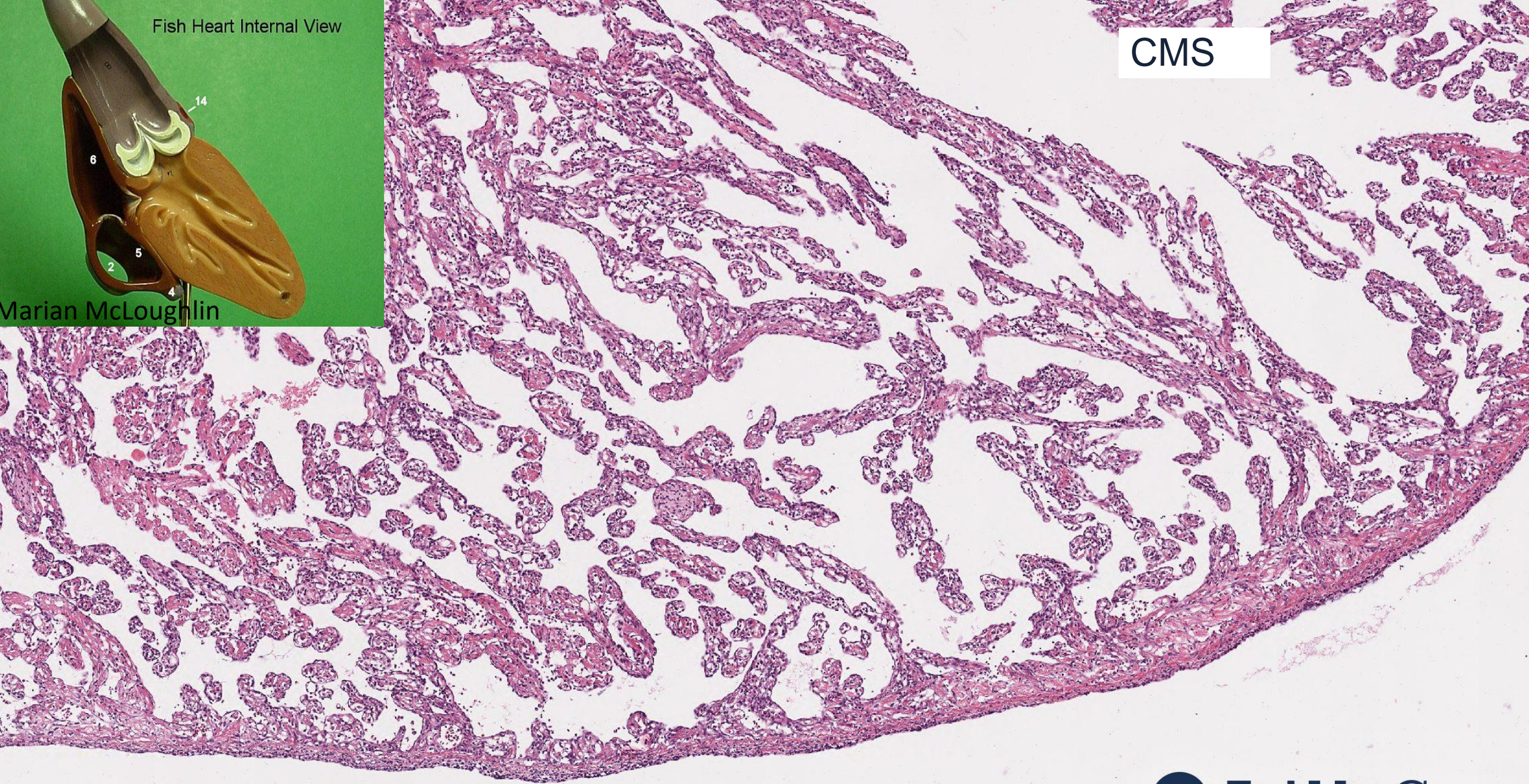


Fish Heart Internal View



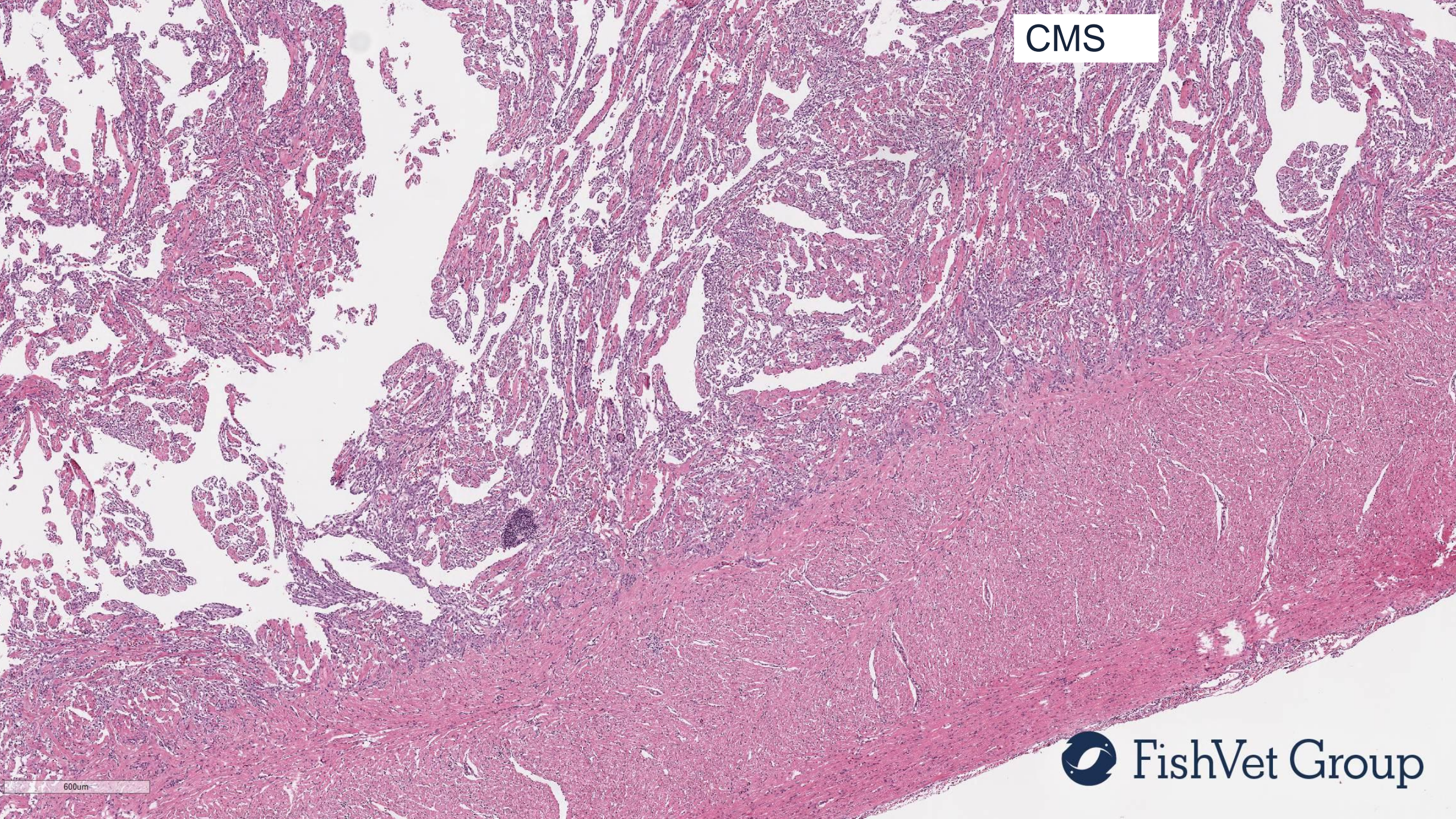
Marian McLoughlin

CMS



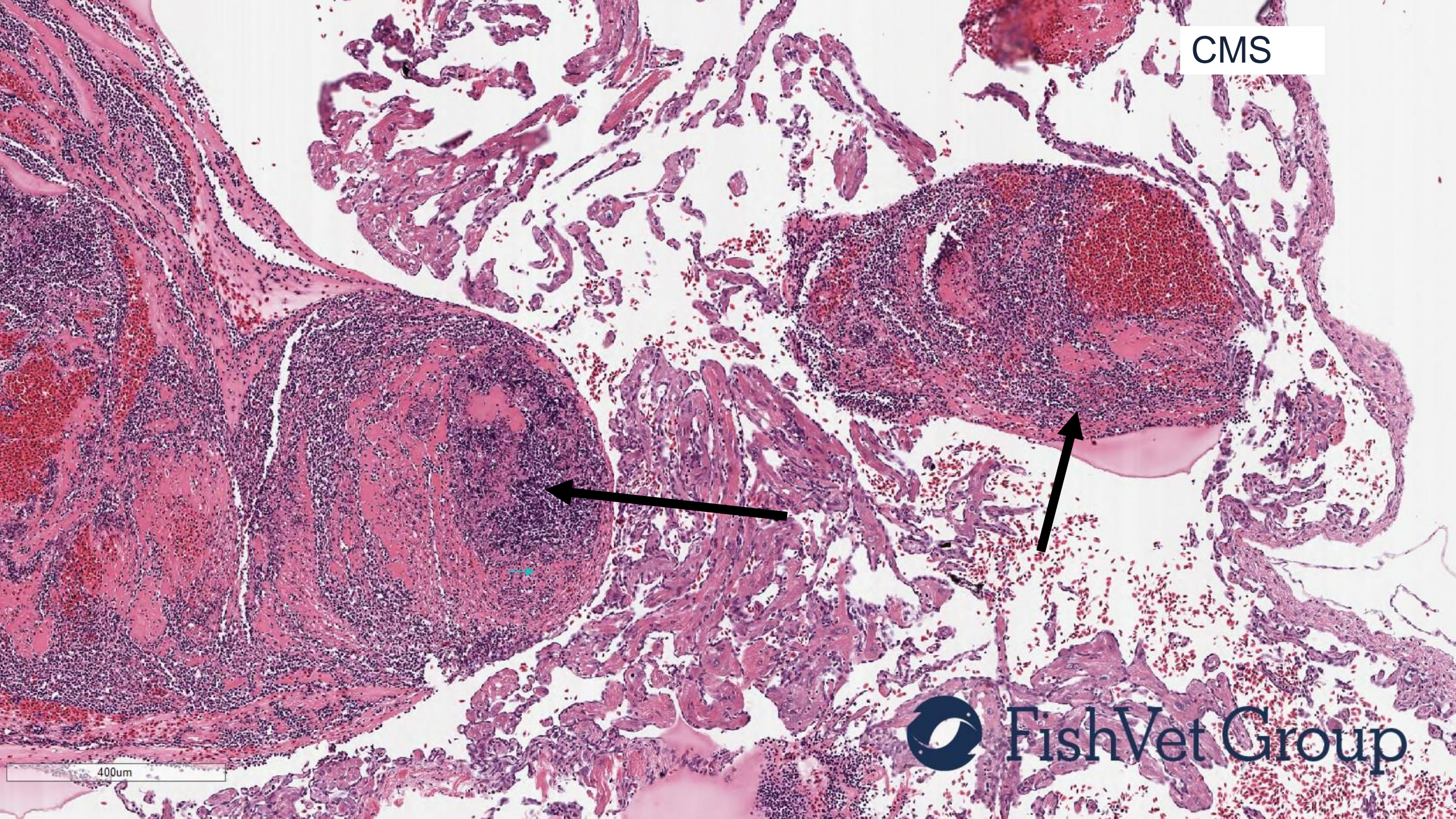
400um

CMS



600um

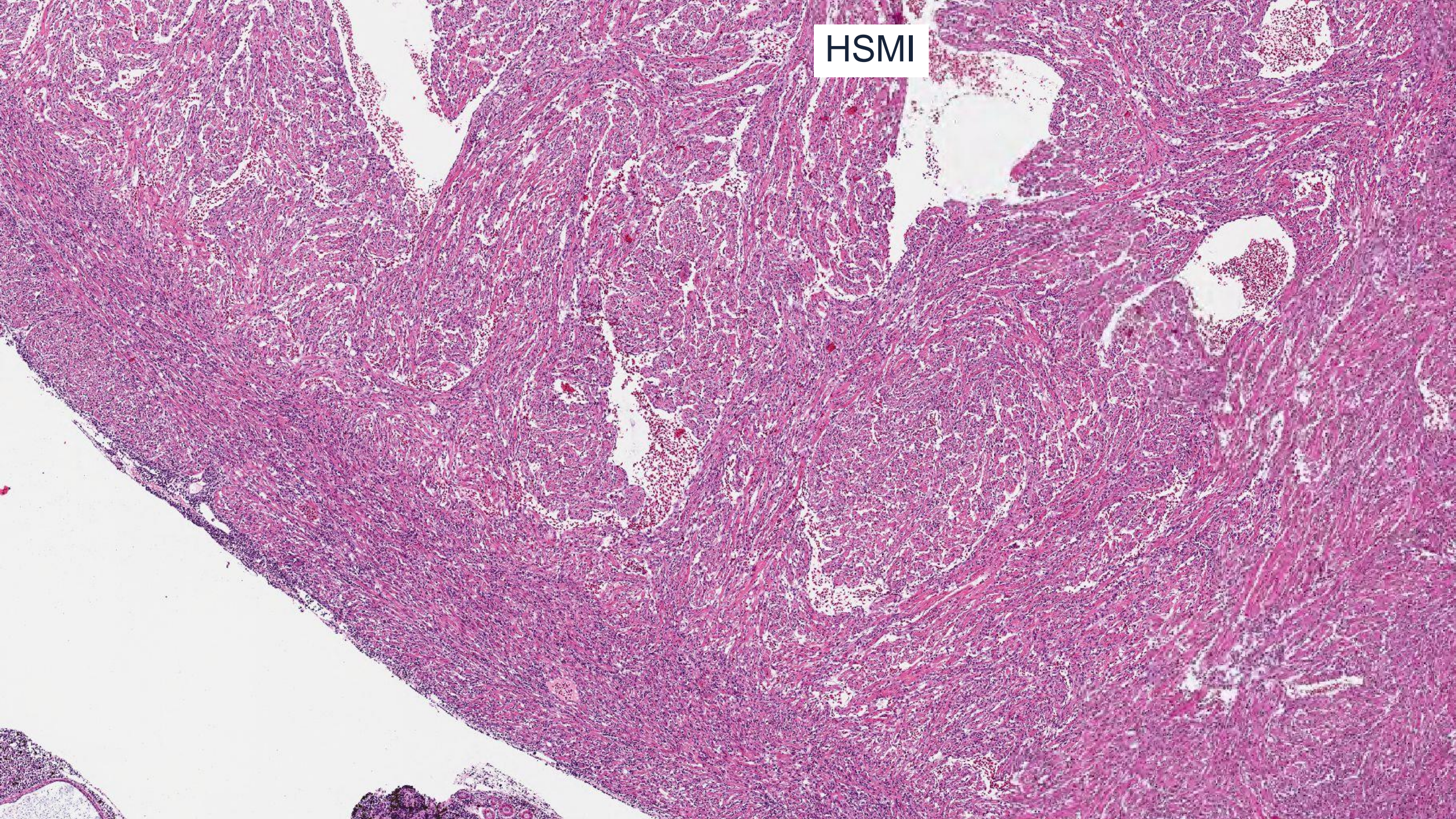
CMS



FishVet Group

400um

HSMI



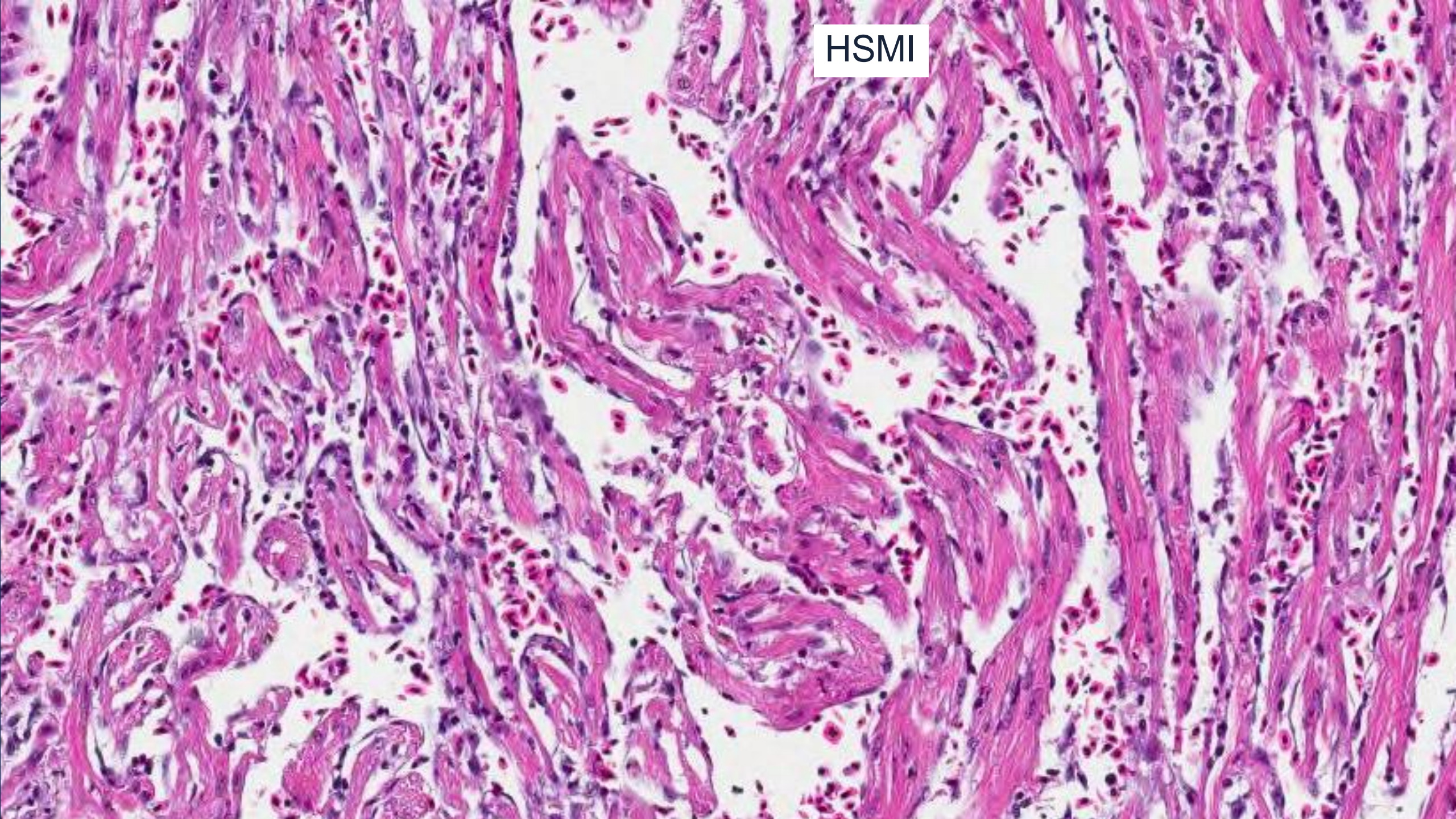
HSMI

300um

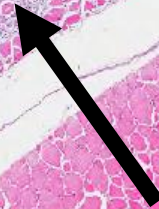


FishVet Group

HSMI



HSMI skeletal muscle



2mm



	Heart				Skeletal muscle		Pancreas
	Atrium	Epicardium	Compact	Spongeous	Red muscle	White muscle	Exocrine
PD	+/-	+/-	+++	+++	+++	+++	+++
CMS	+++	+/-	-	+++	-	-	-
HSMI	+/-	+++	+++	+++	+++	+/-	-



Viral co-infections in farmed Atlantic salmon, *Salmo salar* L., displaying myocarditis

J Wiik-Nielsen¹, M Alarcón¹, B Bang Jensen¹, Ø Haugland² and A B Mikalsen²

¹ Norwegian Veterinary Institute, Oslo, Norway

² Norwegian University of Life Sciences, Department of Basic Science and Aquatic Medicine, Oslo, Norway

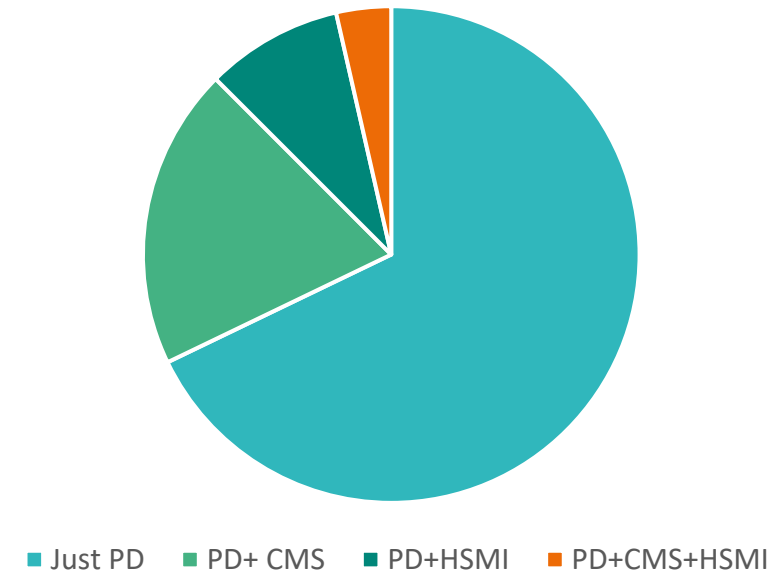




2018 coinfections: our experience

- Suspicion of or detected PD 56 diagnostic cases
- Suspicion or detected CMS 11 diagnostic cases
- Suspicion or detected HSMI 5 diagnostic cases
- Suspicion or detected CMS and HSMI 2 diagnostic cases

Coinfections in fish with PD 2018 at Fish Vet Group (Norway)





Clinical case

- Sea site with atlantic salmon, norwegian west coast
 - Sea transfer 1 year previously
 - 6 months previously: PRV detected
 - 5 months previously: SAV (PD) detected, PMCV detected
-
- Clinical history: Atrial rupture and hemopericardium and circulatory failure



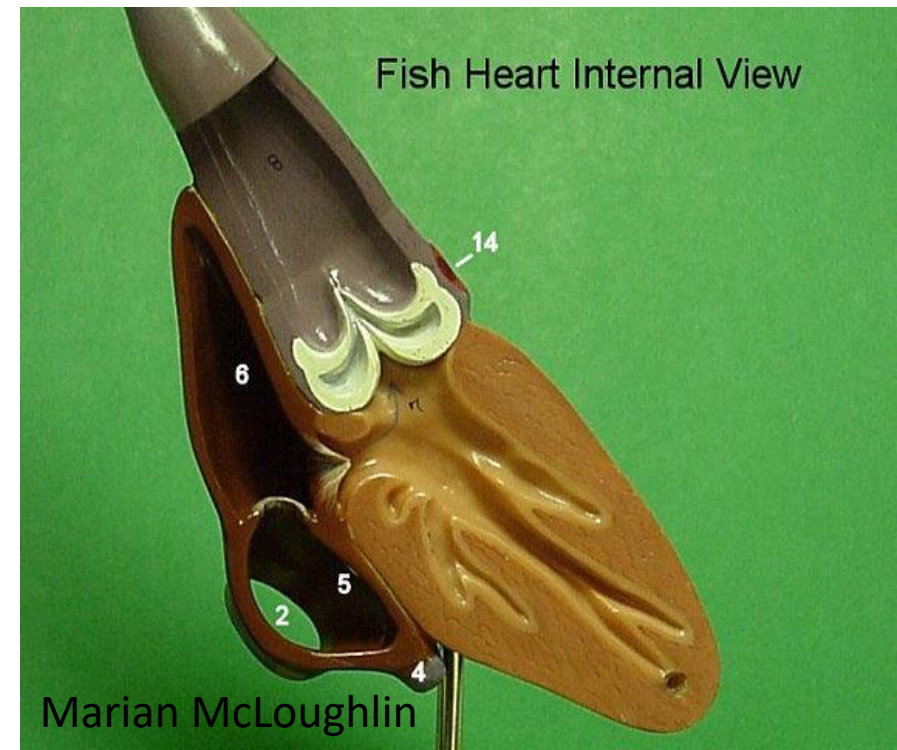
PCR results

	SAV	PRV	PMCV
1	34,95	35,62	12,86
2	-	35,12	14,12
3	34.06	34,92	12,16
4	34.08	35,68	16,11
5	-	33,71	11,48
6	-	33,63	11,84
7	31.49	33,69	11,03



FAQ: co-infections on histopathology

- Why is the histopathology not diagnostic?
- What infection killed the fish?





Thanks to

- Britt Kari Legård, FoMAS
- Marian McLoughlin, Fish Vet Group
- Marta Alarcon, Fish Vet Group