



# Fiskepatologi

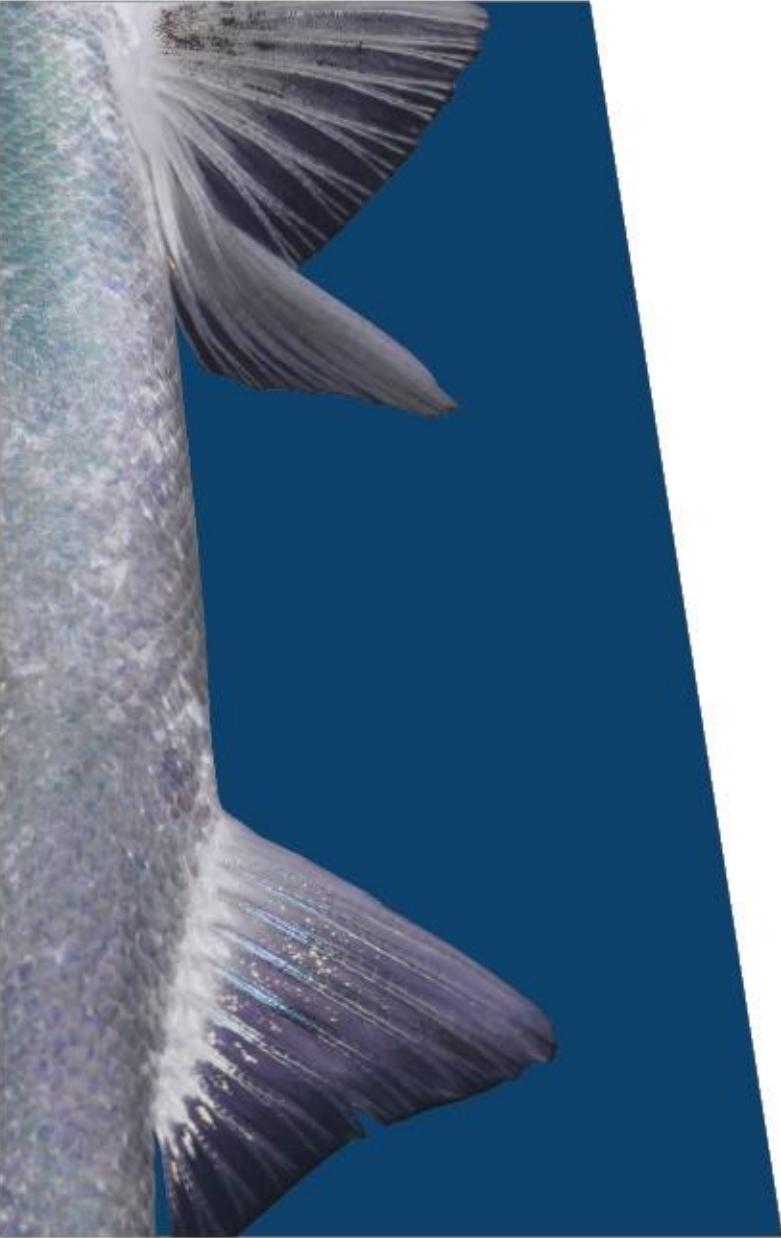
William Reed  
veterinærpatolog

Oslo 2023

# Agenda

- Pharmaq Analytiq
- Norsk fiskeoppdrett
- Histopatologi på fisk – hvordan jobber vi?
- Eksempler på forandringer og sykdommer





# Pharmaq Analytiq

- Tilbyr diagnostiske tjenester til fiskeoppdrettsnæringen
- Største servicelinjer: PCR, histopatologi og mikrobiologi
- Hovedkontor i Bergen
- Laboratorier i Bergen, Oslo, Rørvik, Skottland og Chile
- 100 ansatte, ca. 50 i Norge
- Del av Zoetis



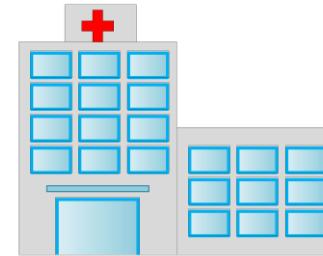
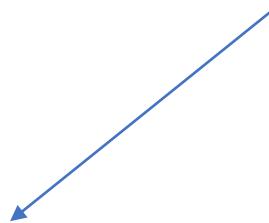
# Norsk fiskeoppdrett

- En viktig næring for Norge
- Hovedsakelig atlantisk laks og regnbueørret
- Enorm utvikling

|                           | 1994          | 2021          |
|---------------------------|---------------|---------------|
| Produksjon (tonn)         | 200 000       | 1 600 000     |
| Førstehåndsverdi (kroner) | 10 milliarder | 80 milliarder |

- Utfordringer: fiskehelse –og velferd
- Fiskehelserapporten i 2017: tap av laks kostet 13 250 millioner og 88% av tapet var grunnet skade eller sykdom

# Histopatologi på fisk – hvordan jobber vi?



Fiskehelsetjeneste





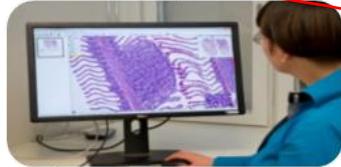
Prøvemottak



Makrobeskjæring



Fremføring



Analysert av patolog



Digitalisering



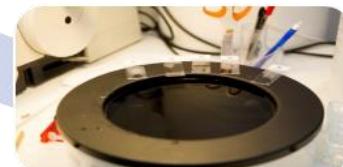
Innstøping



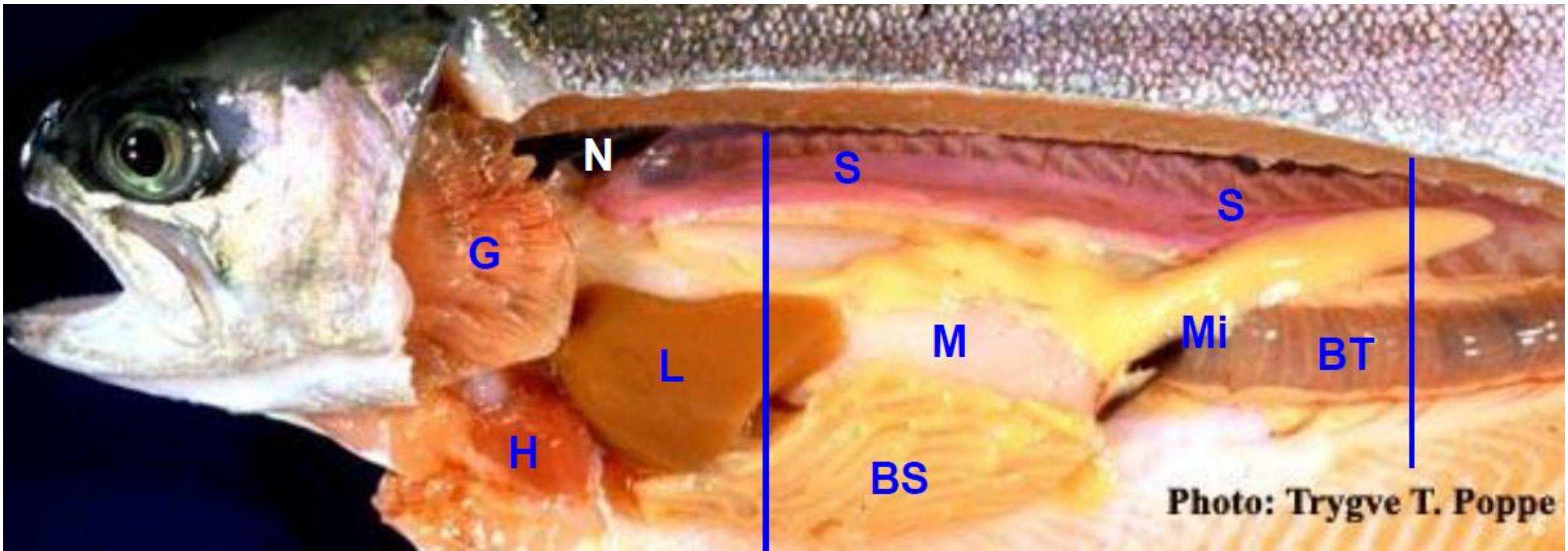
Farging



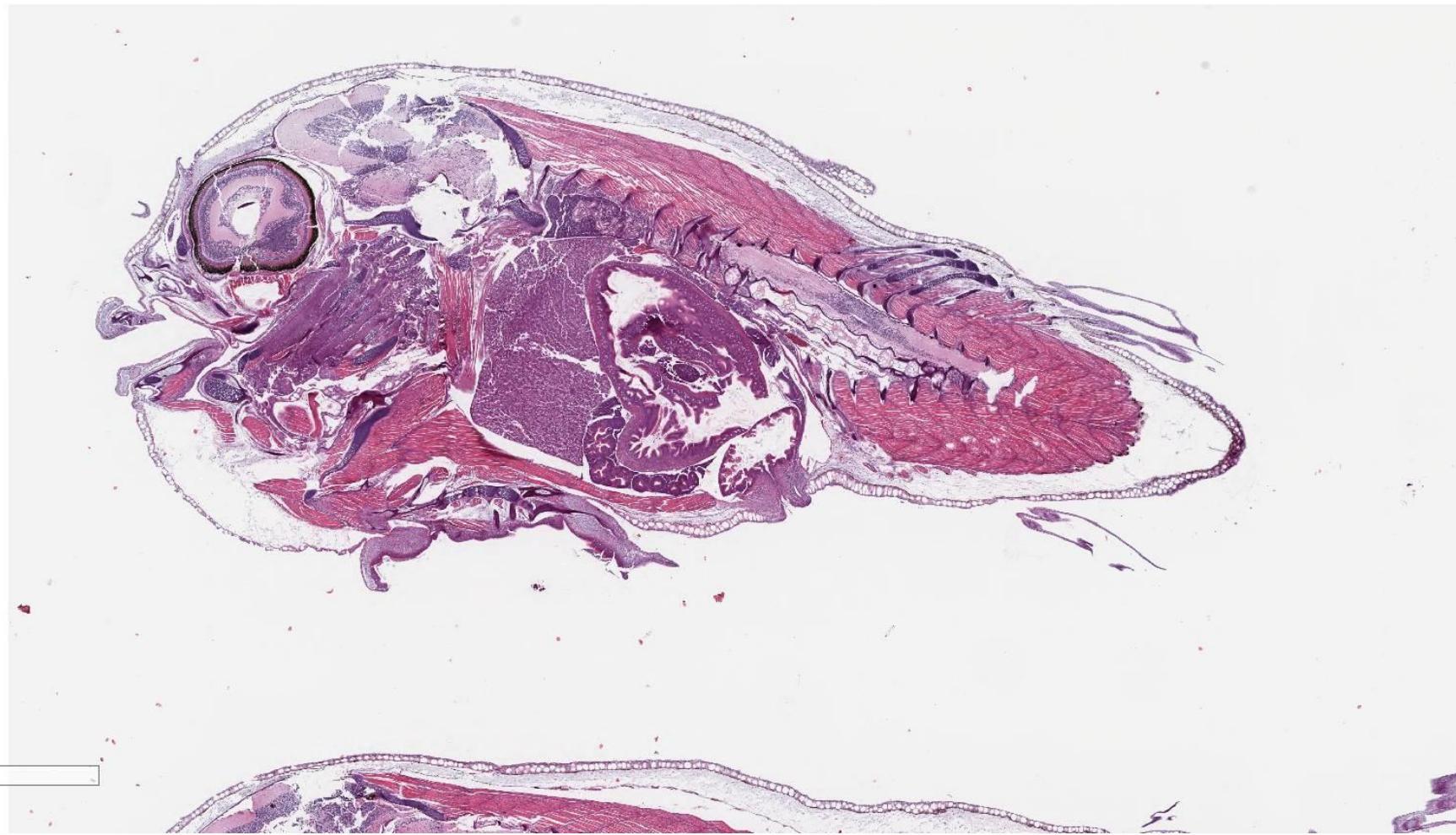
Snitting



# Makroanatomi



# Mikroanatomi

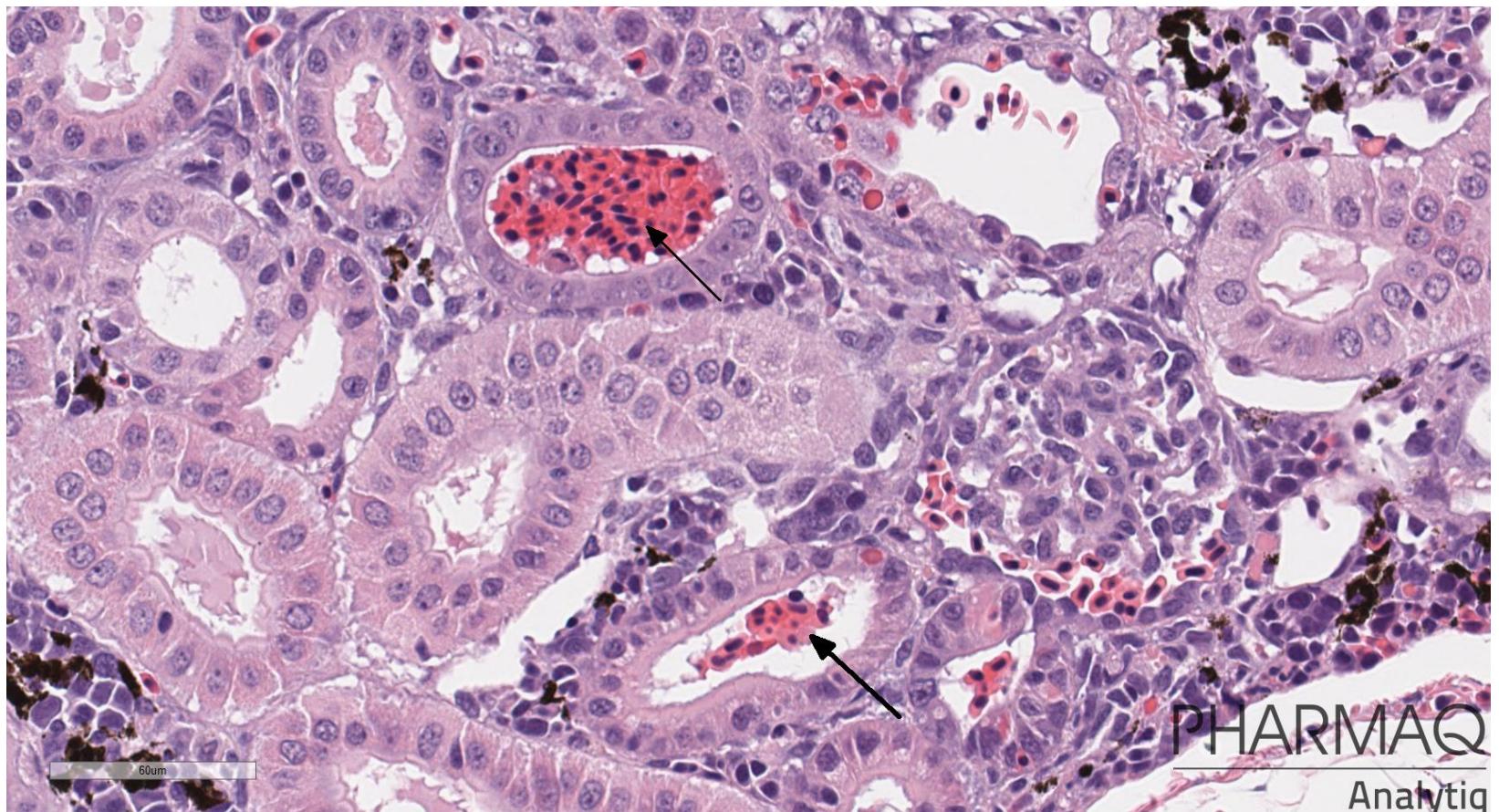




# Histopatologi fisk

- Postmortelle forandringer er en utfordring
- HE-farging mest brukt i rutinediagnostikk
- Standard snittykkelse: 1,5 µm
- Spesialfarginger brukes regelmessig, for eksempel Gram, Giemsa, PAS og Ziehl-Neelsen
- Immunhistokjemi av og til

# Blod i nyretubuli (HE)

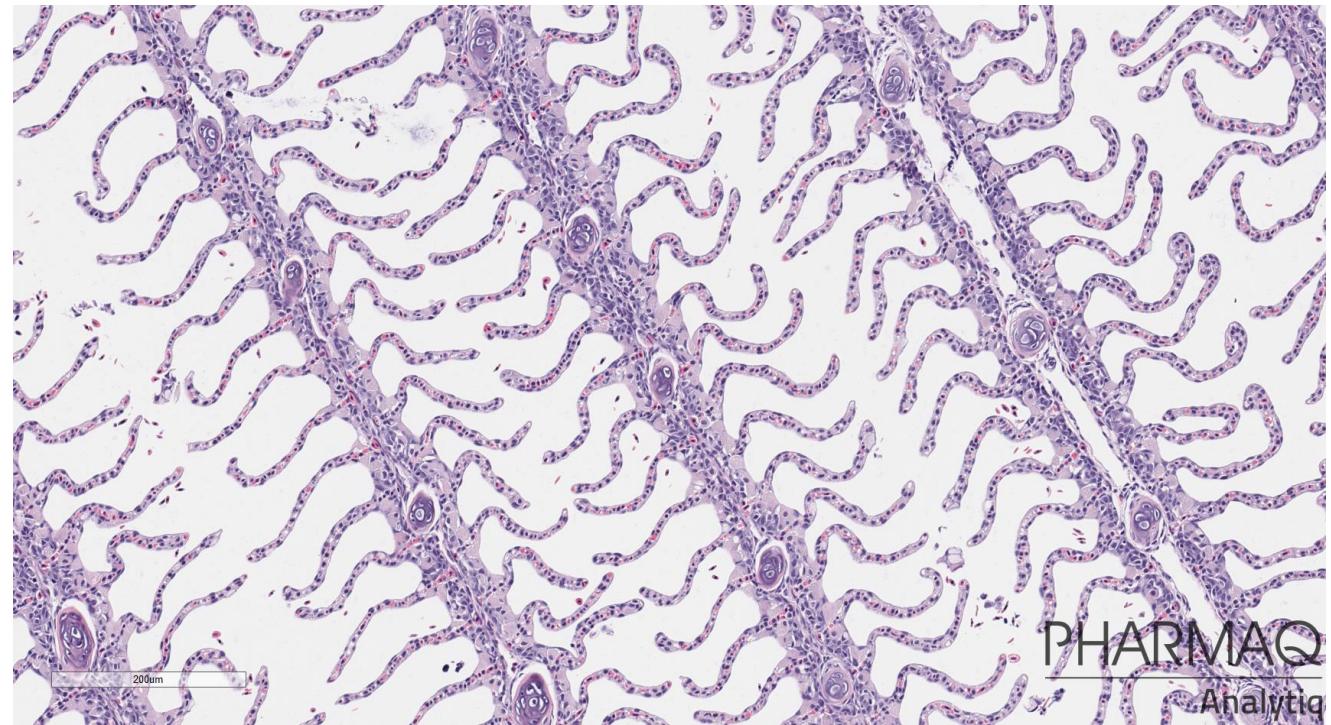
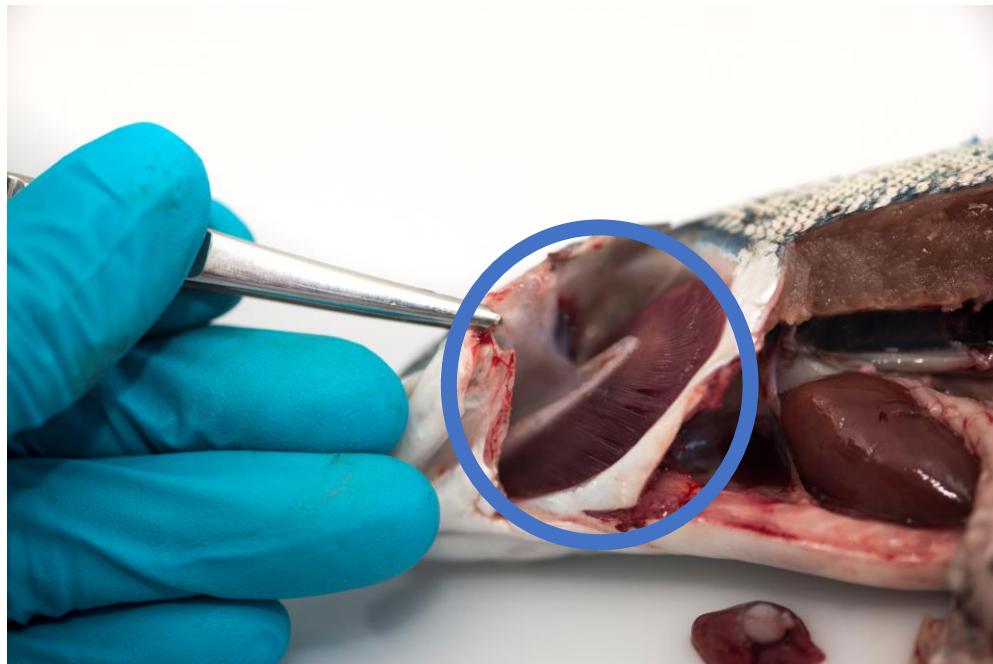


PHARMAQ  
Analytiq

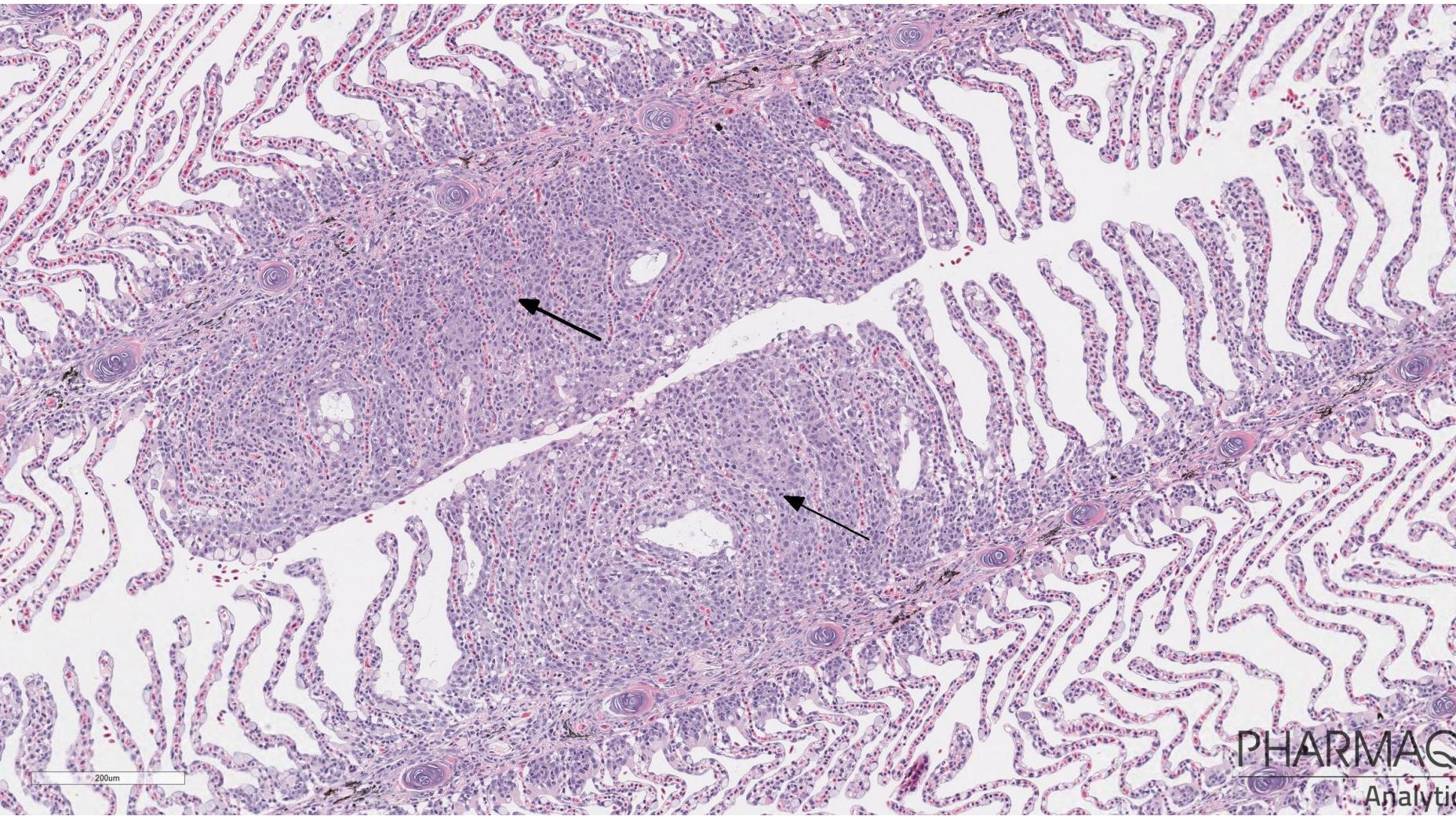
A close-up photograph of a fish's head, likely a salmon or trout, against a dark background. The fish has a mottled green and brown pattern on its scales. Its large, dark eye is prominent, and its mouth is slightly open, revealing a pinkish interior. The skin appears slightly textured and moist.

Eksempler på forandringer i gjeller, hjerte og hud

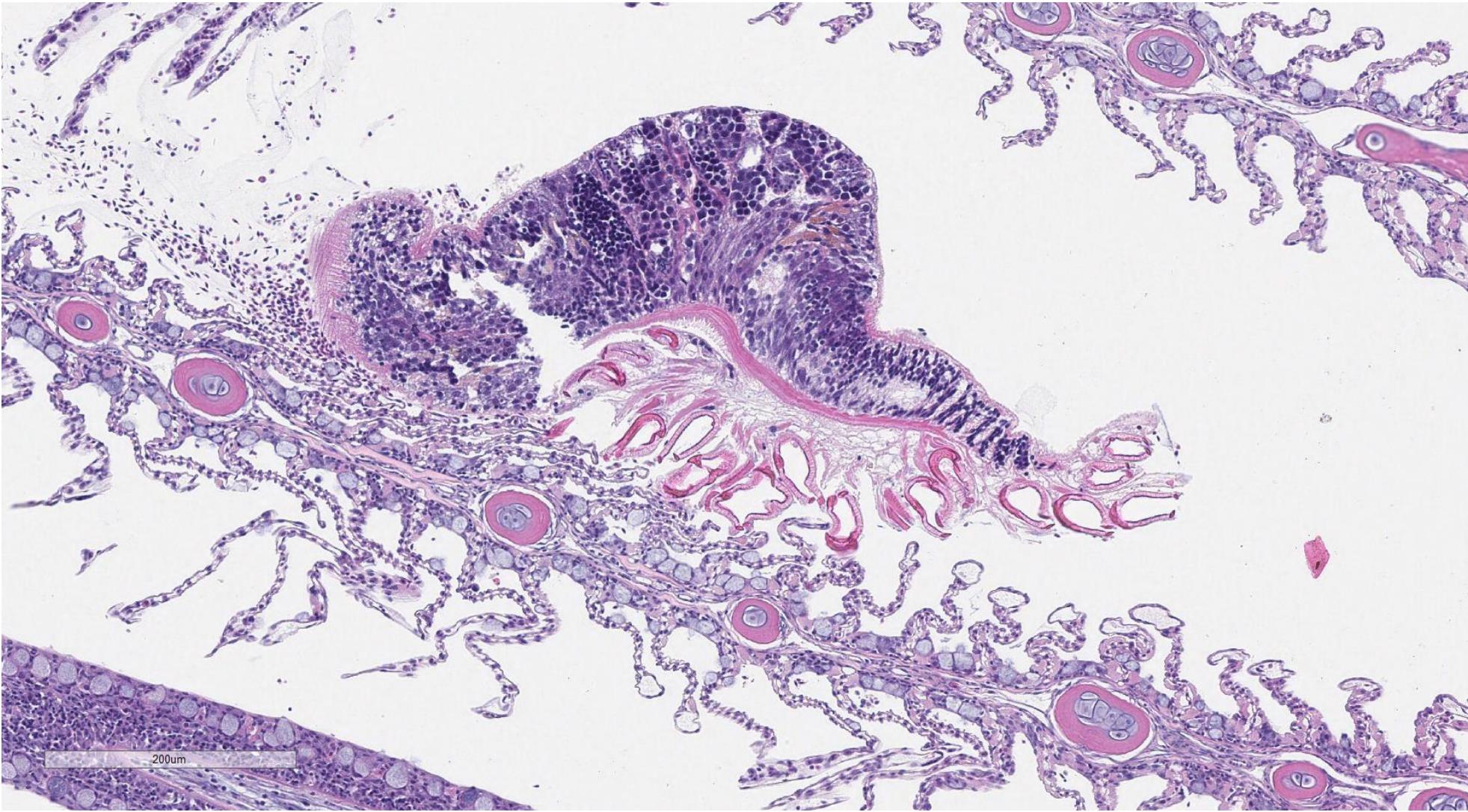
# Normal gjelle (HE)



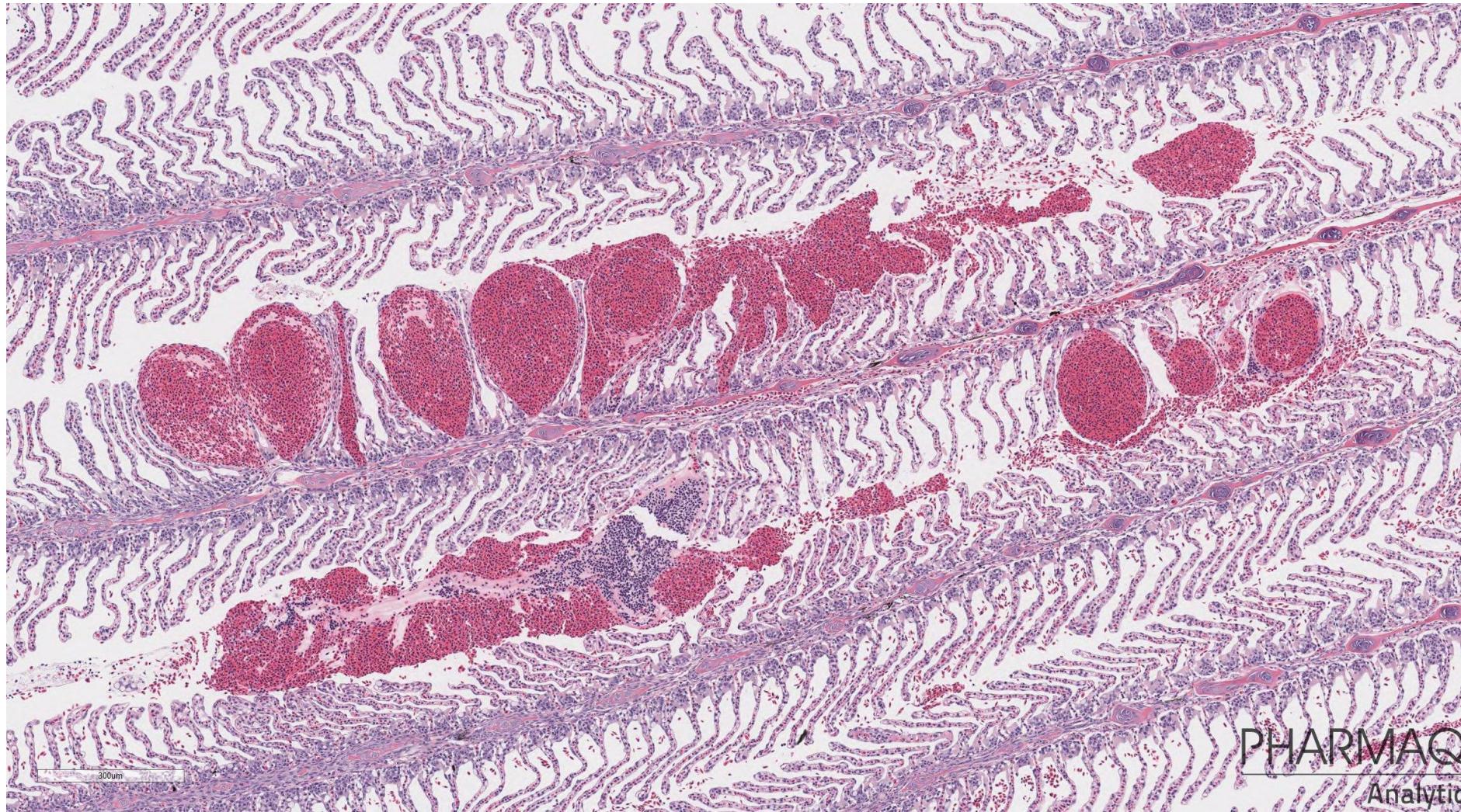
# Hyperplasi og sammenvoksing (HE)



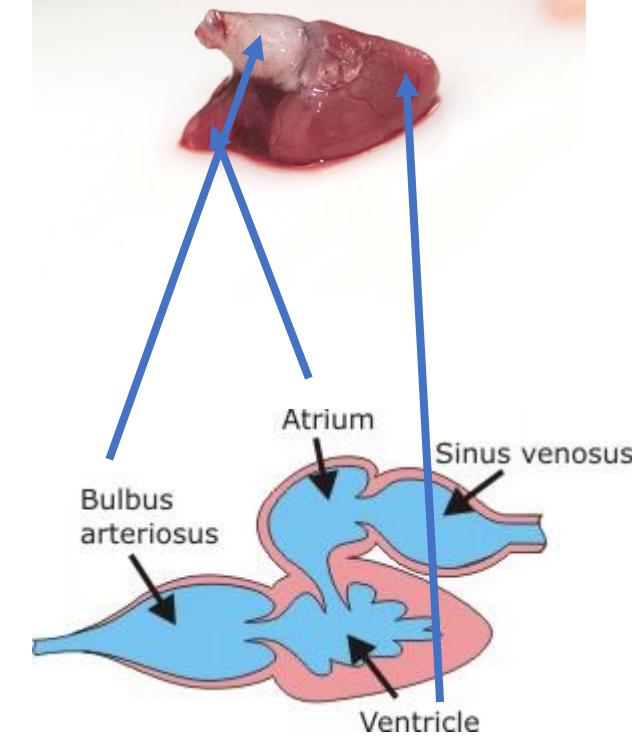
# Gjeller: haptormark (HE)



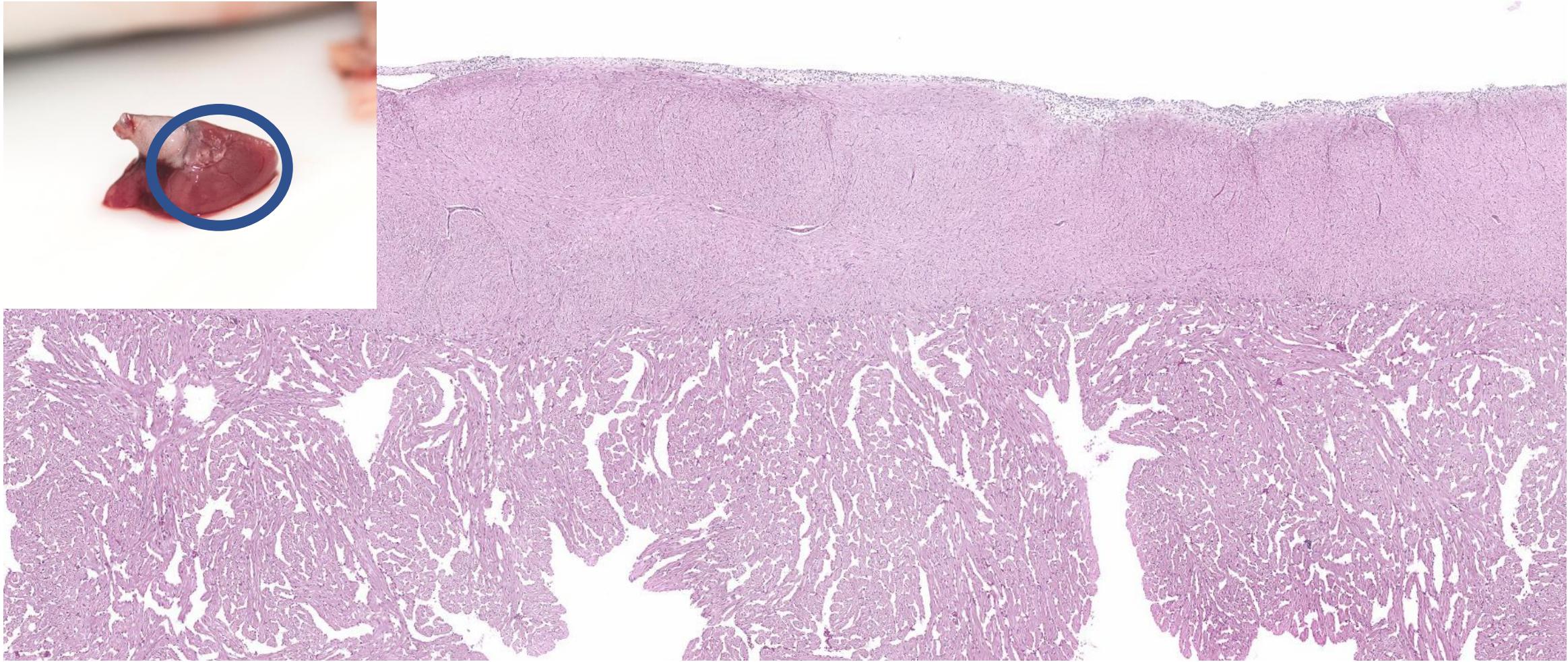
# Gjelleblødninger (HE)



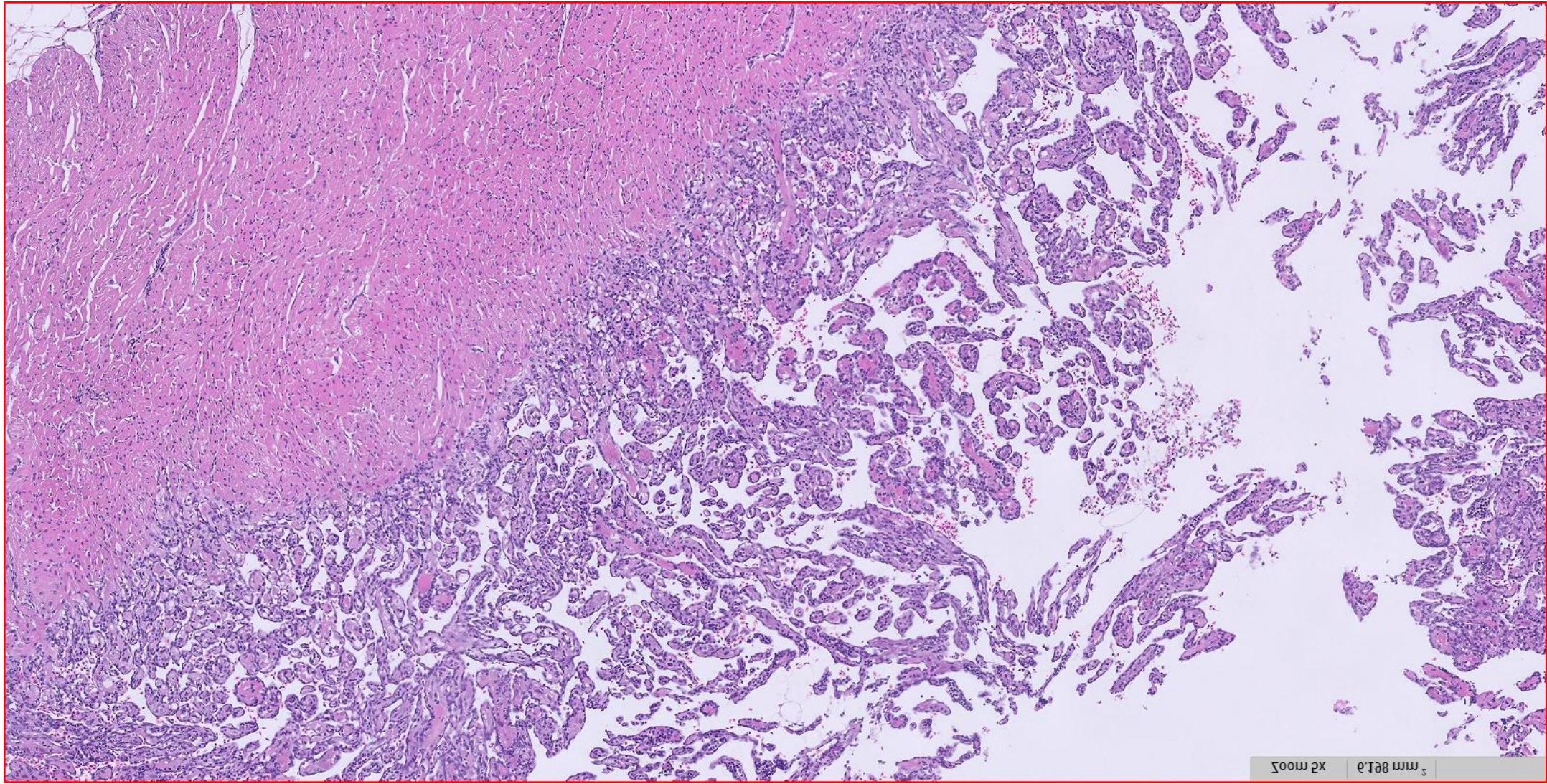
# Hjerte, oversikt



# Normalt hjerte fra villaks (HE)



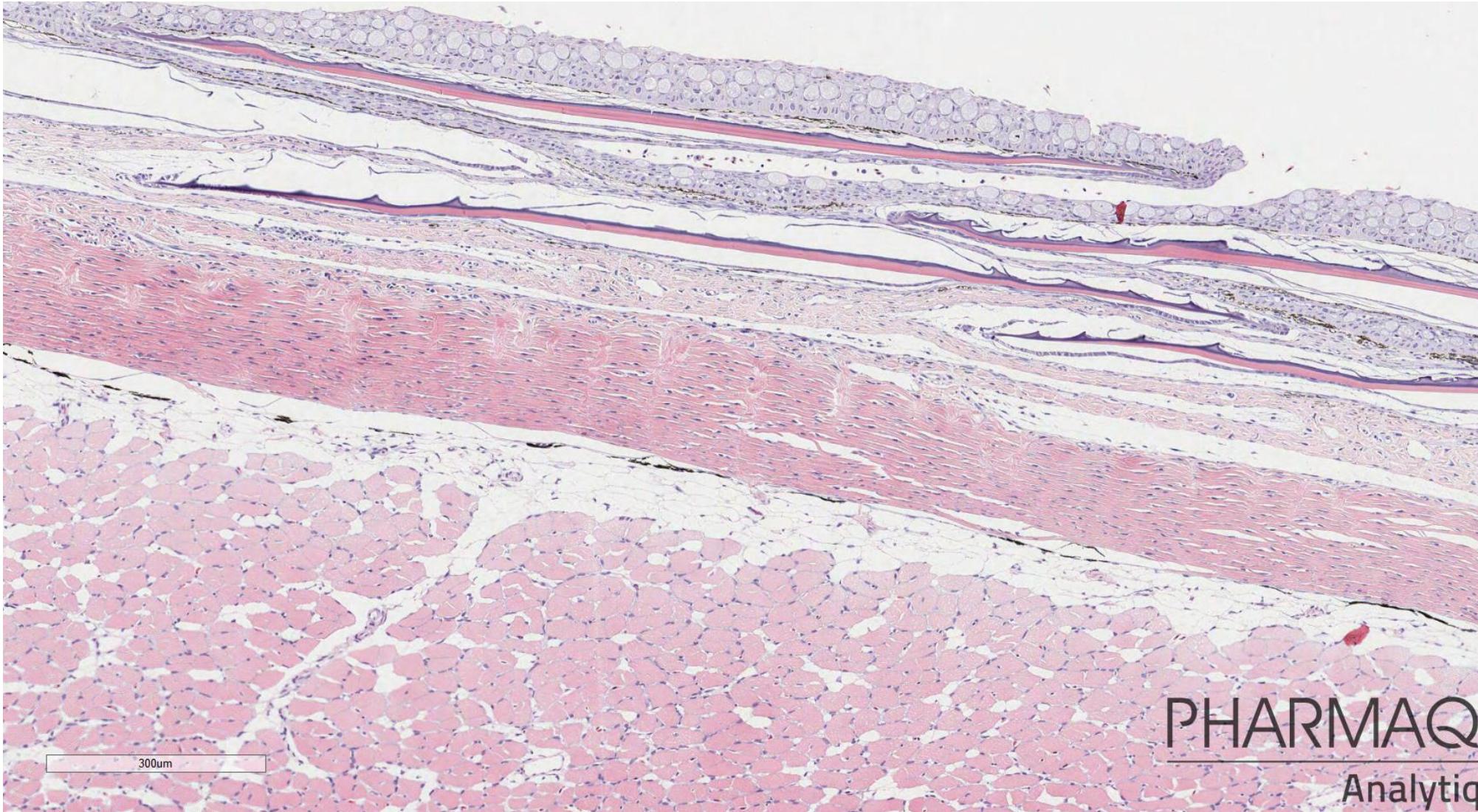
# Hjerte: CMS (HE)



# Hud - sår

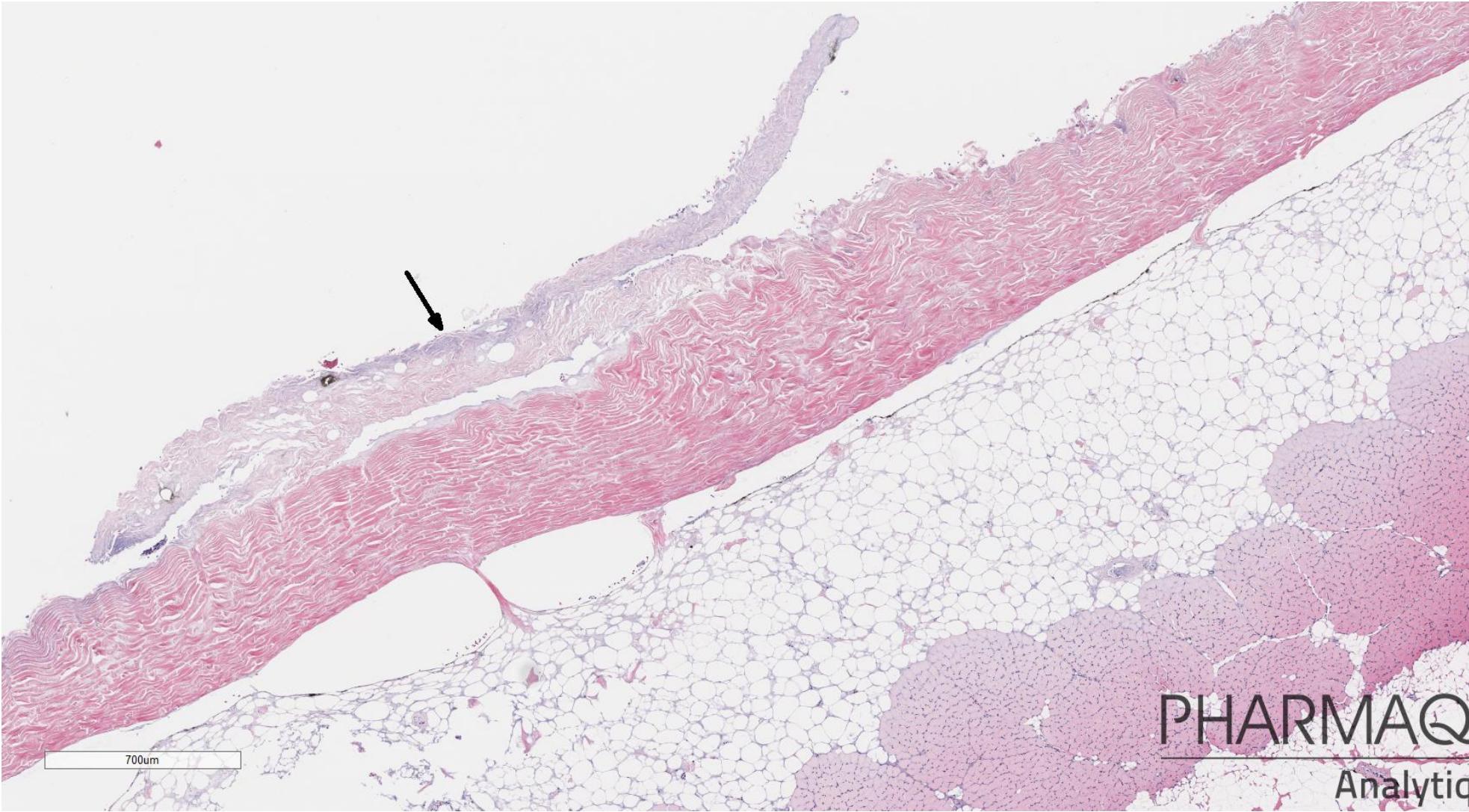


# Normal hud (HE)

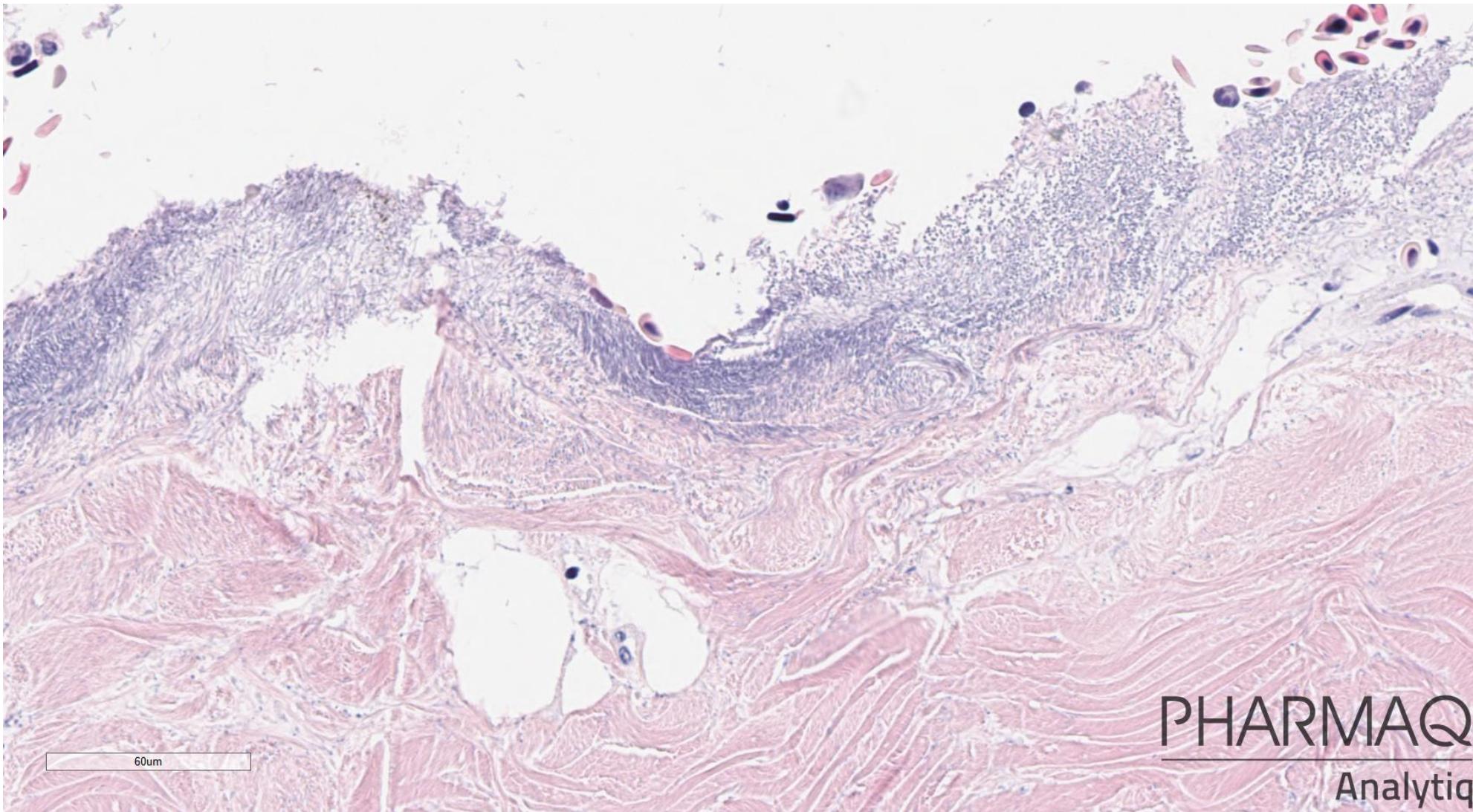


PHARMAQ  
Analytiq

# Sår, oversikt 1 (HE)

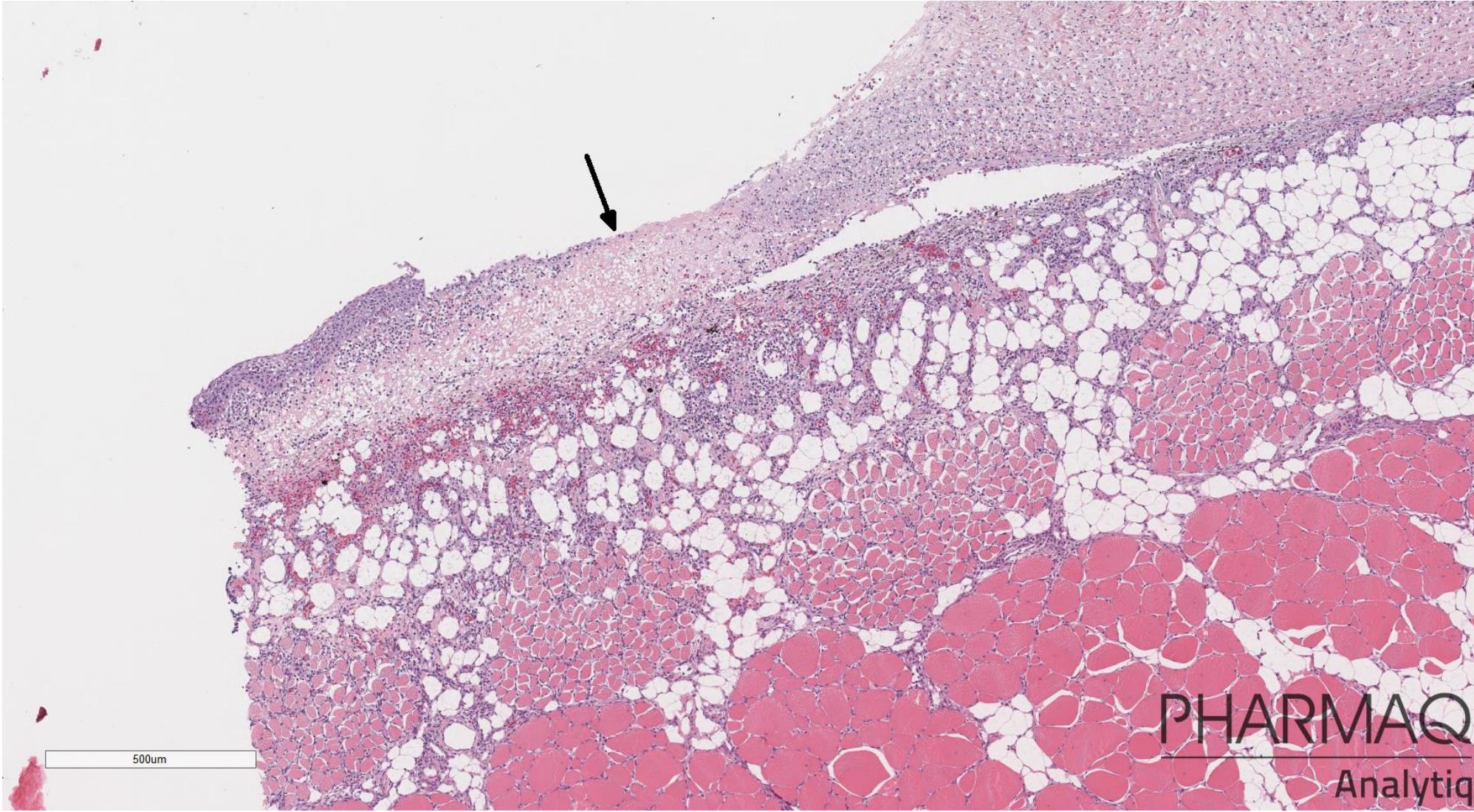


# Sår (HE)



PHARMAQ  
Analytiq

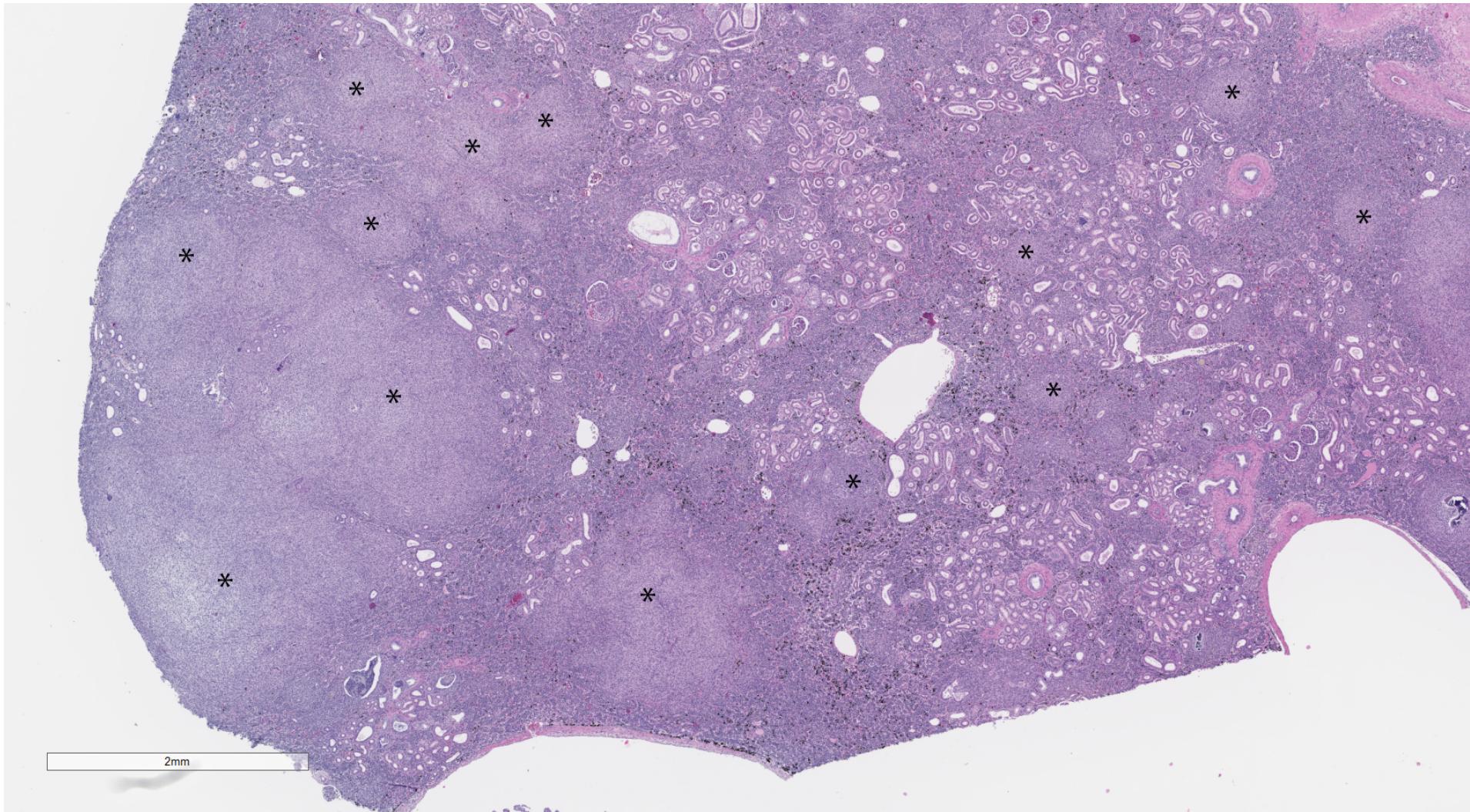
# Sår, oversikt 2 (HE)



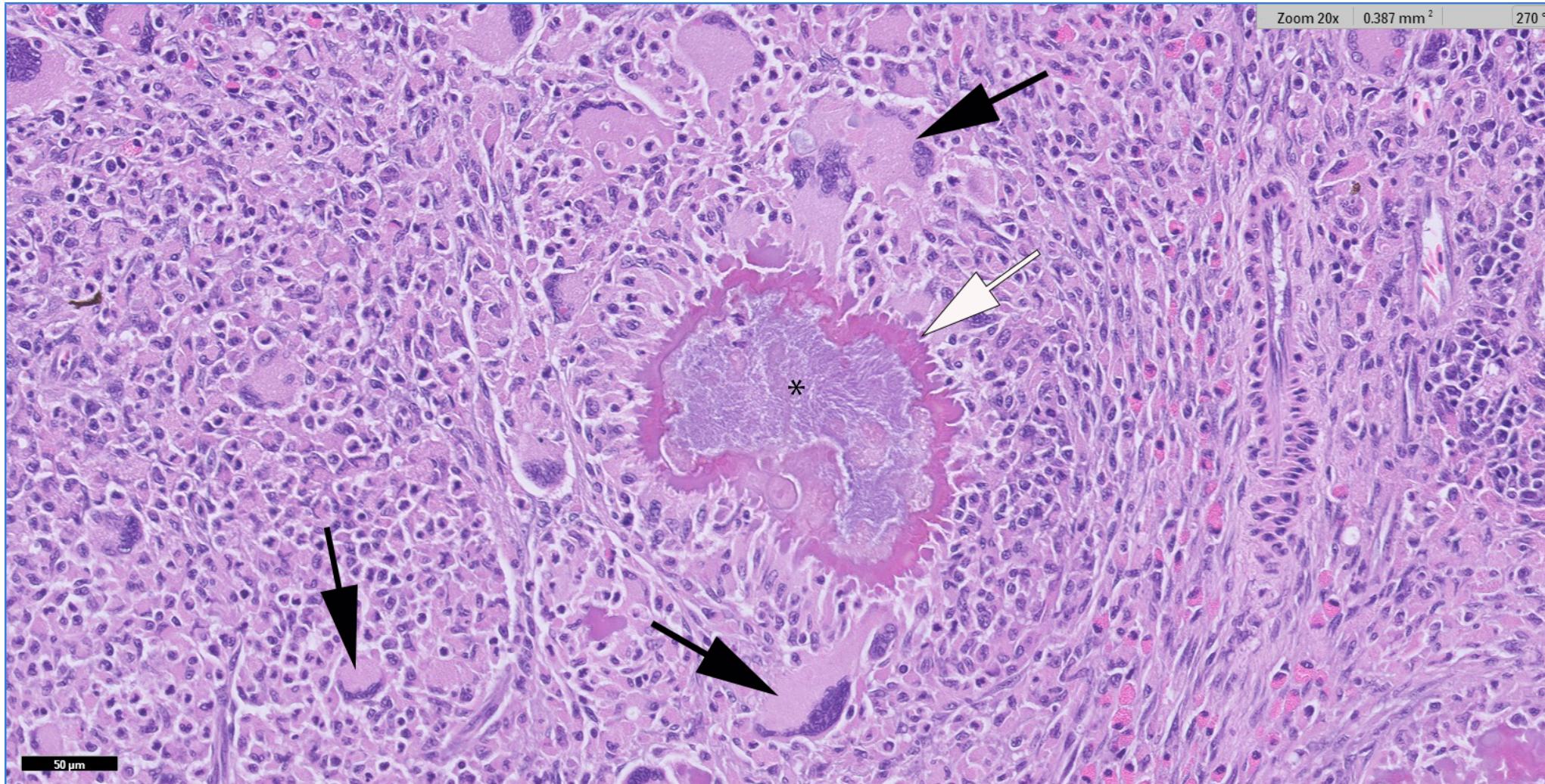
A close-up photograph of a fish's head, likely a salmon or trout, showing signs of illness. The skin is dark and mottled with green and yellowish spots. The gills are visible and appear discolored or damaged. The eye is prominent and appears healthy.

## Eksempler på sykdommer: mykobakteriose og infeksiøs pankreasnekrose (IPN)

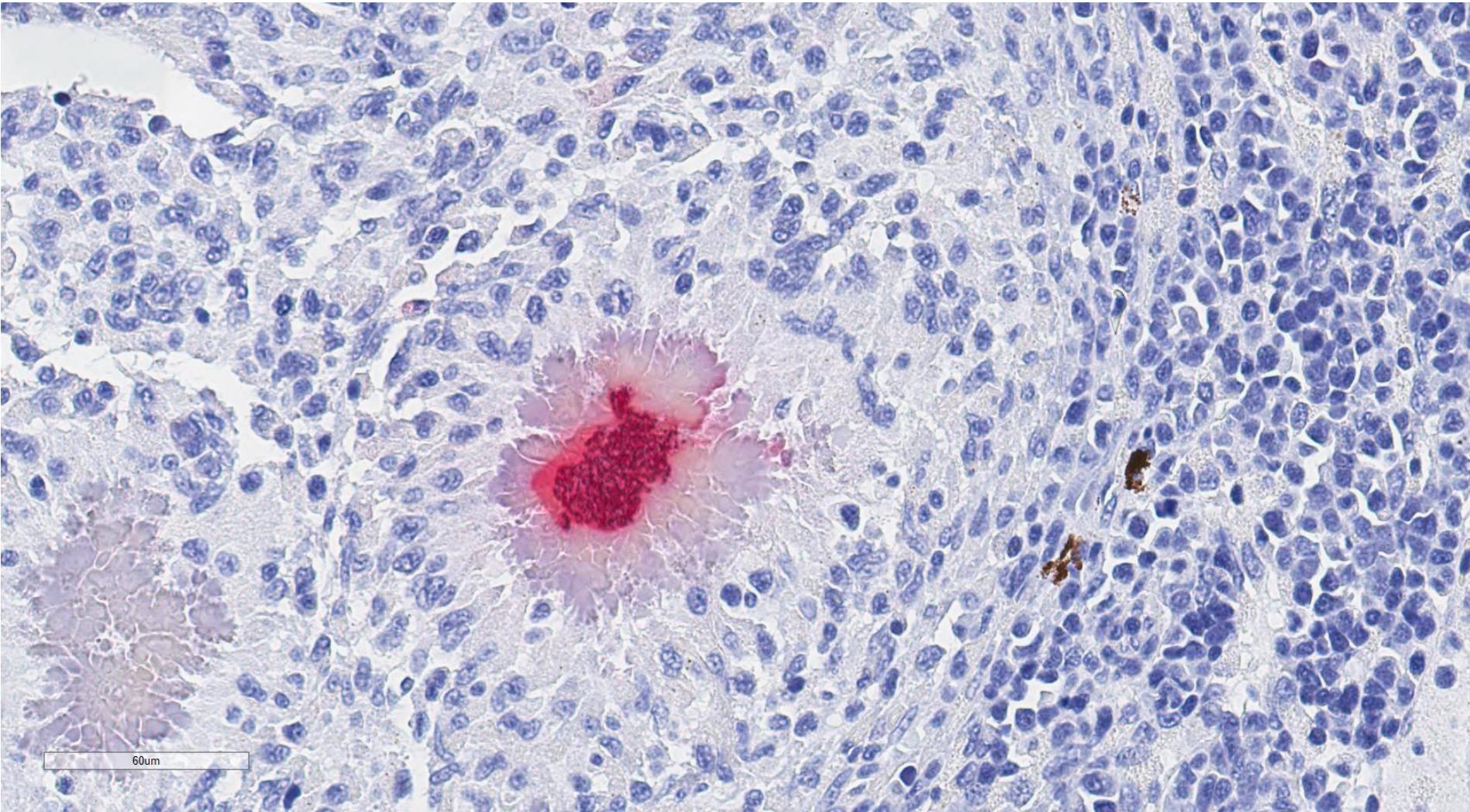
# Mykobakteriose, nyre (HE)



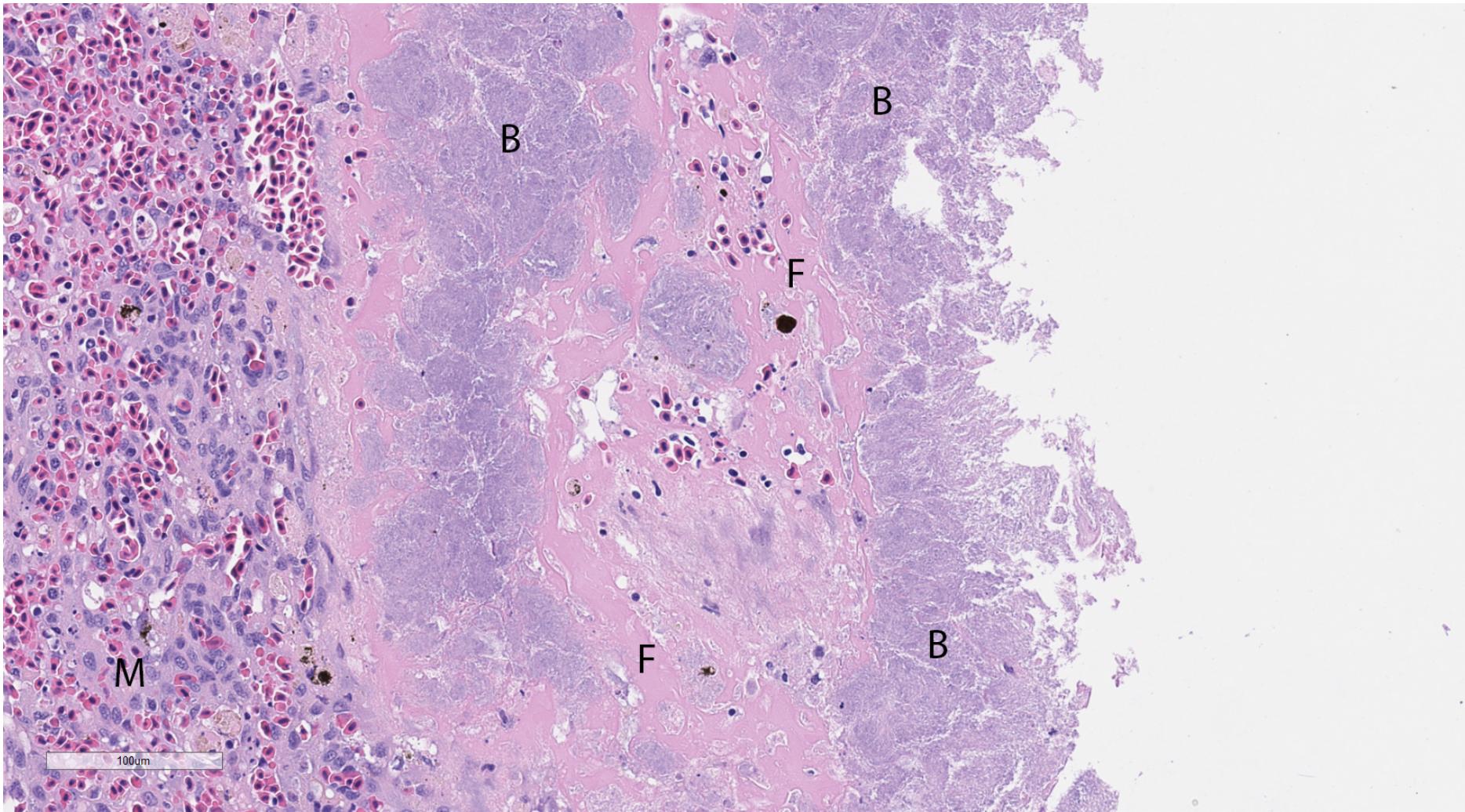
# Mykobakteriose, nyre 2 (HE)



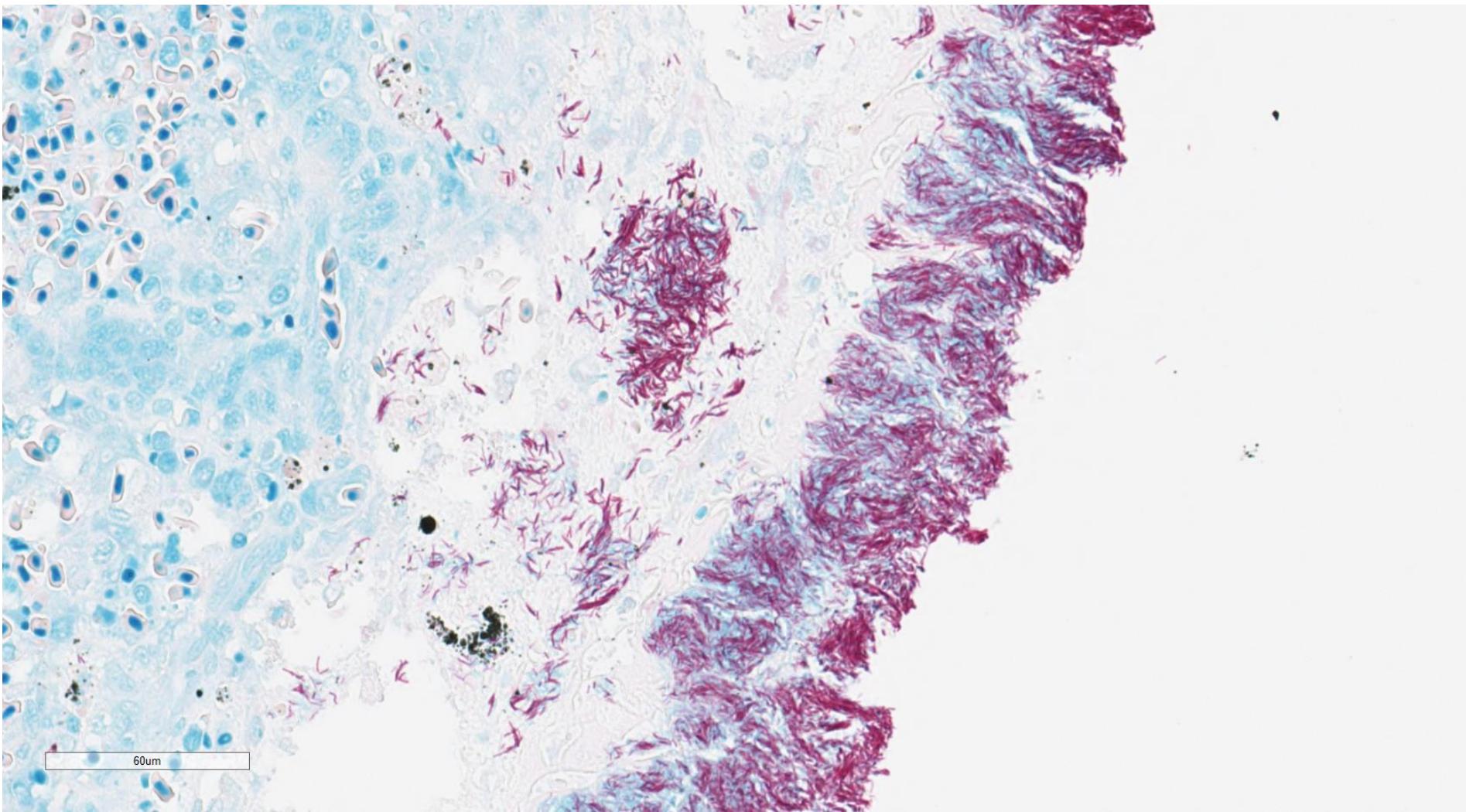
# Mykobakteriose, nyre (IHK)



# Akutt bukhinnebetennelse (HE)



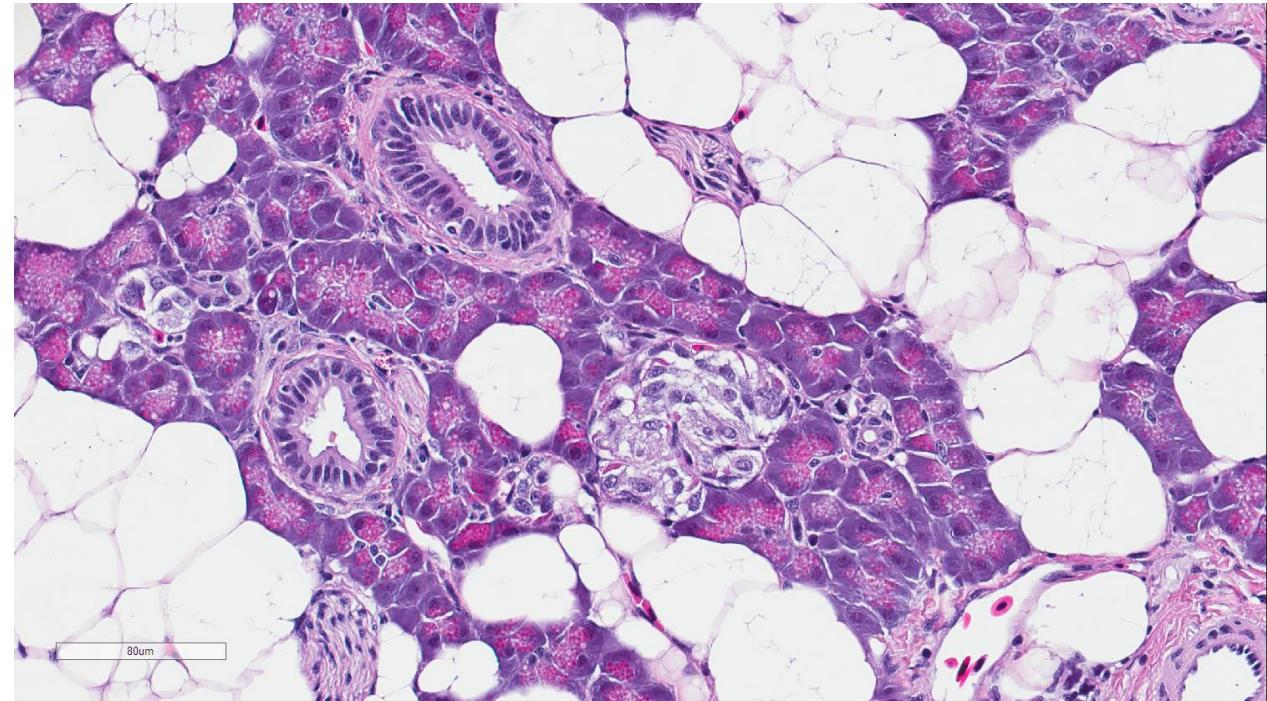
# Ziehl-Neelsen



# Infeksiøs pankreasnekrose (IPN)

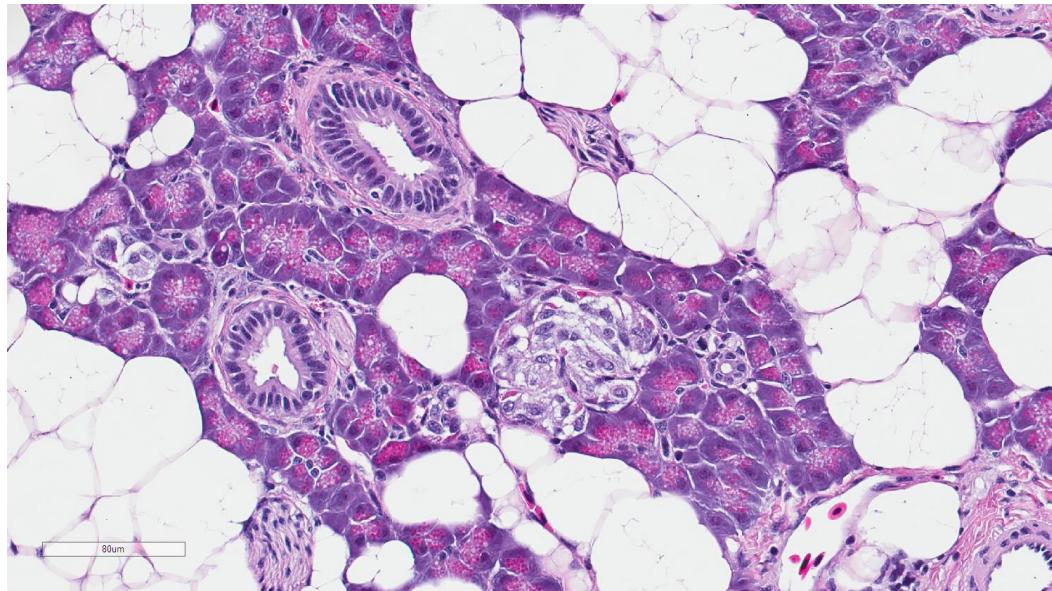


Pankreas ligger i fettvevet mellom  
blindsekkene

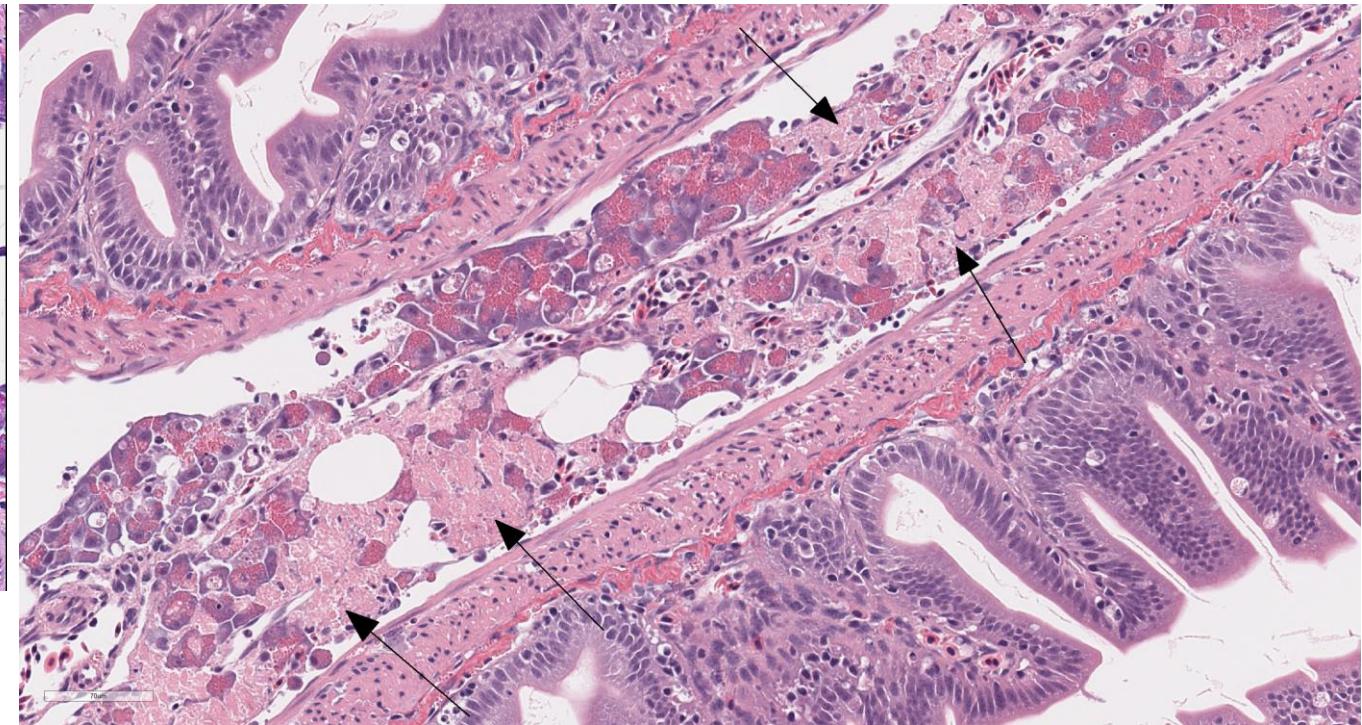


Normal pankreas (HE)

# IPN

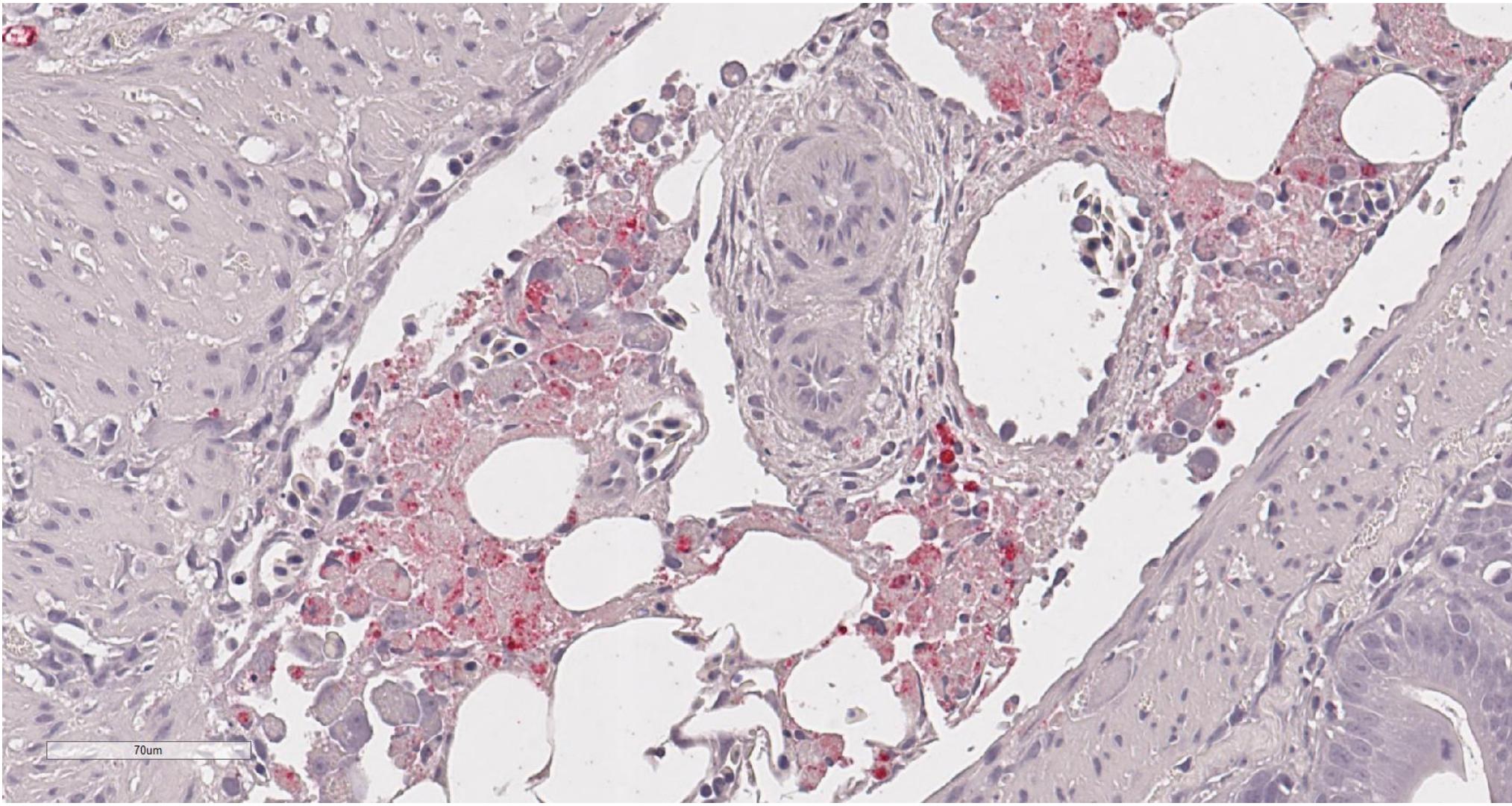


Normal pankreas (HE)



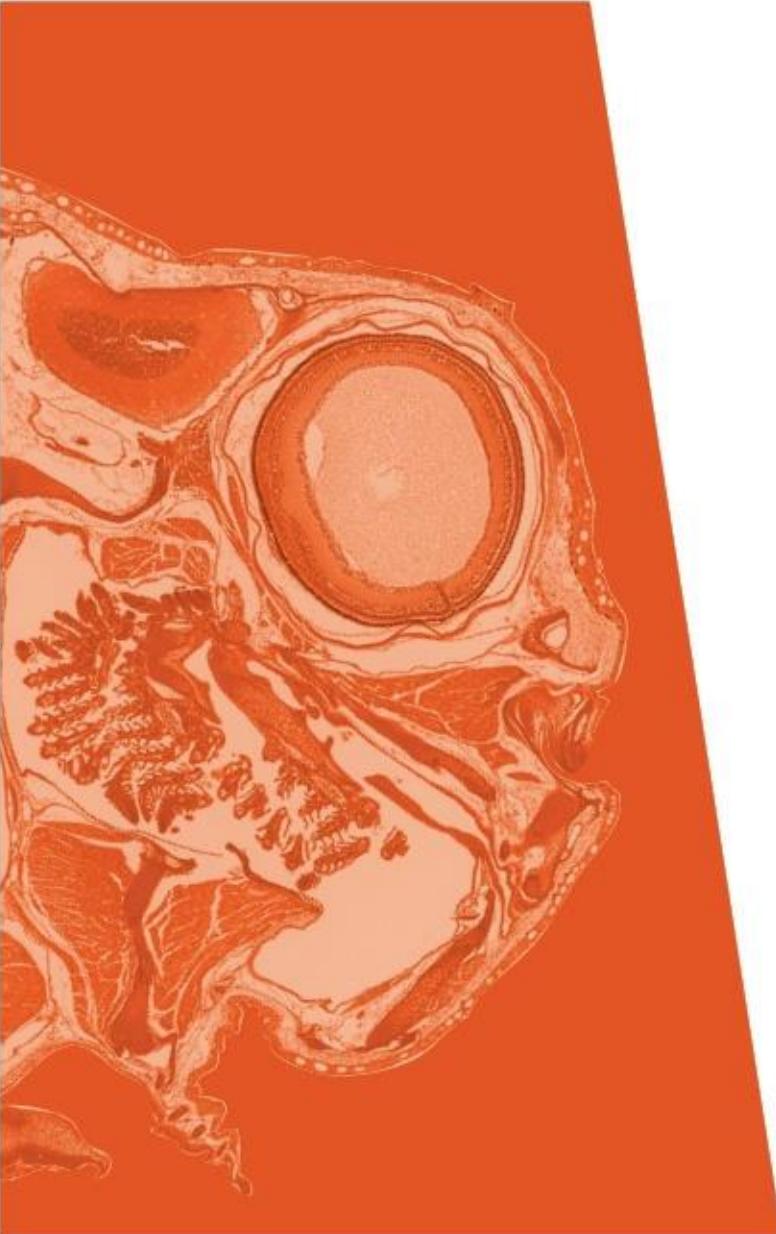
Akutte nekroser i pankreas (HE)

# Immunfarging for IPNV



# Til slutt

- Histopatologi er en hjørnestein i diagnostikken
- Viktig for å bedre fiskehelse- og velferd
- Spennende fagfelt med mange dyktige kolleger ☺





Takk for oppmerksomheten 😊

[william.reed@zoetis.com](mailto:william.reed@zoetis.com)