

White Back Trout Lesions

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Chief Complaint, Signalment, and History

- What did the client call you for – Two veterinarians were at the trout farm to train veterinary students in May 2024. The veterinarians and the producer discussed the pale to white lesions on the backs of 5-month-old rainbow trout that had been transferred two weeks prior from a windowless indoor hatchery building to earthen outdoor flow-through raceways. An estimate of less than 5% of the trout were affected. There were no significant mortalities noted and feeding and growth appeared normal to the producer. This was the first time this condition was noted on this farm.
- Basic demographic information about the patient- domestic strain of rainbow trout raised on a farm in southern Wisconsin for human consumption. No antibiotic or other drug treatment history.
- What the owner reported to you -The producer indicated that the feed was more than 12 months old. Farm staff noticed that the feed smelled “different.” The producer purchased new feed and began feeding the first week of July.









Physical Examination, Pondside Diagnostic Testing, and Imaging

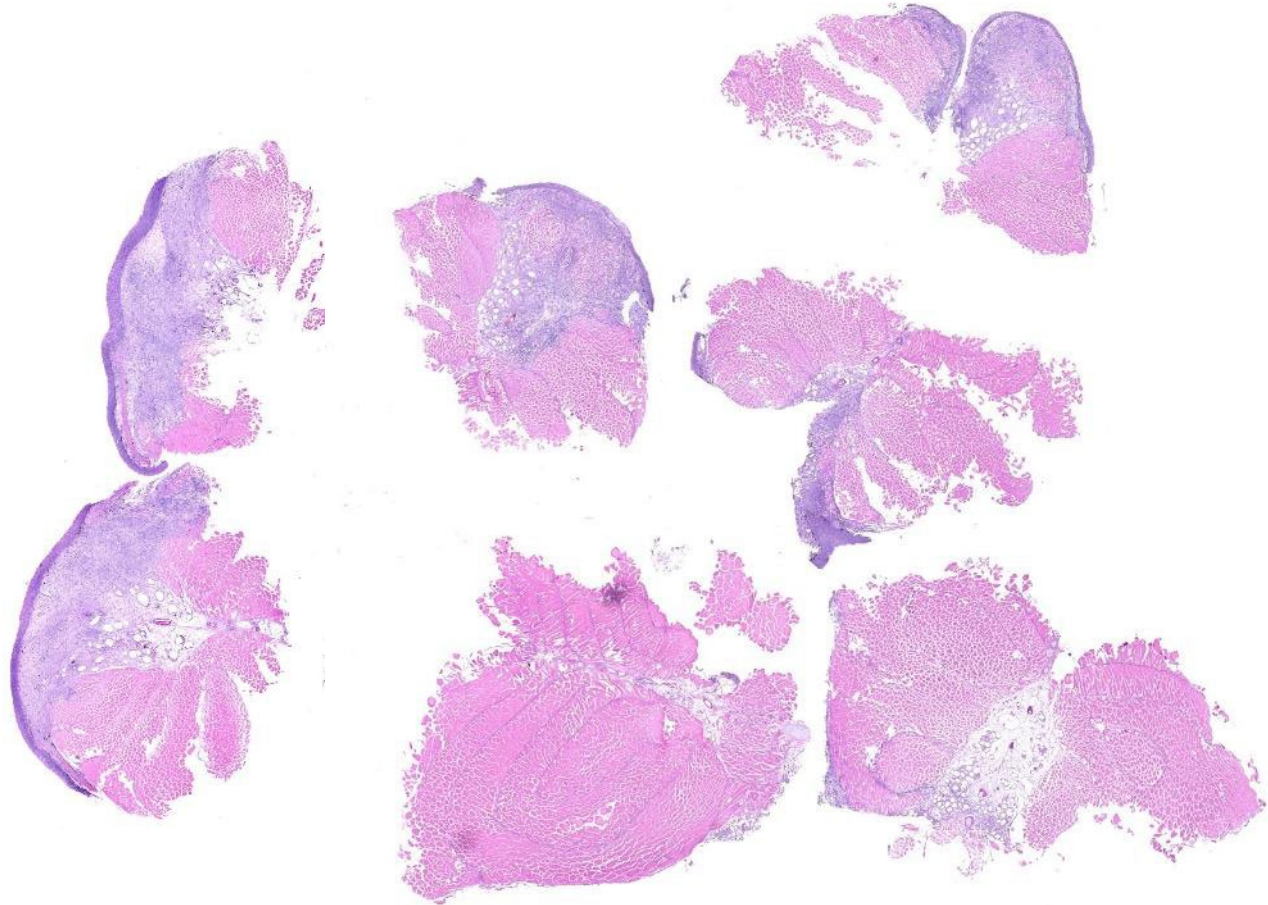
- Physical examination findings -The fish appeared to be active, alert, and showing normal swimming behavior. The lesions appeared very symmetrical, and all associated with the dorsal surface. Some had lesions that were approximately one third of the total length of the body and the width extended ventral equally on both sides of the fish approximately 10-20% ventrally toward the ventral mid-line. The remainder of the body of the affected fish appeared normal.
- Diagnostic testing performed “pondside” (water quality, wet mounts, cytology, bloodwork, etc.) – skin scrape negative
- Imaging (ultrasound, radiographs, etc.) -none

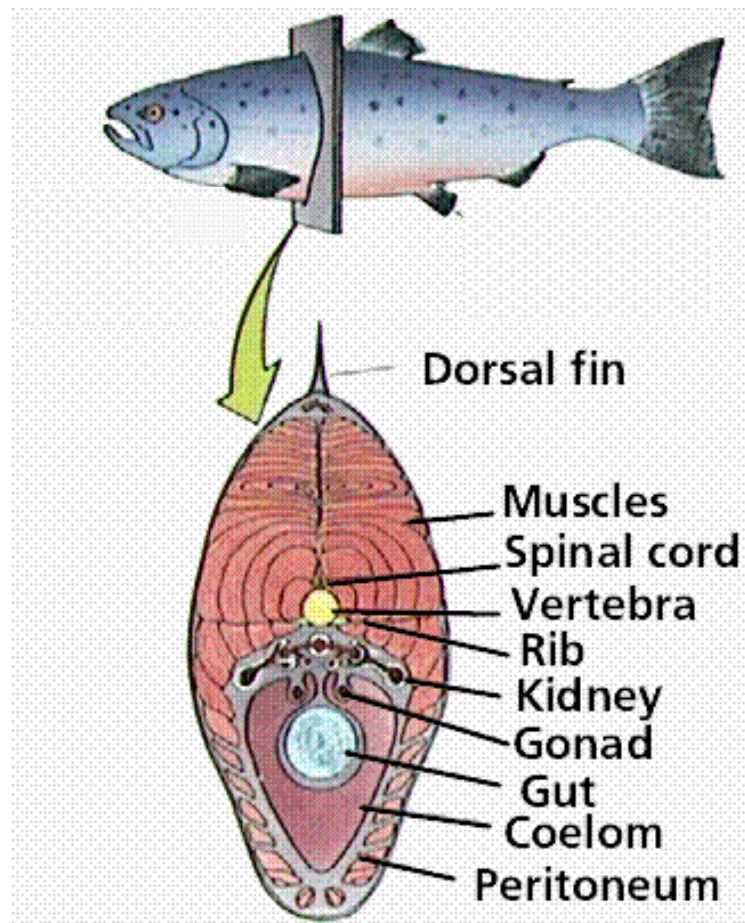
Clinician's Differentials and Laboratory Samples

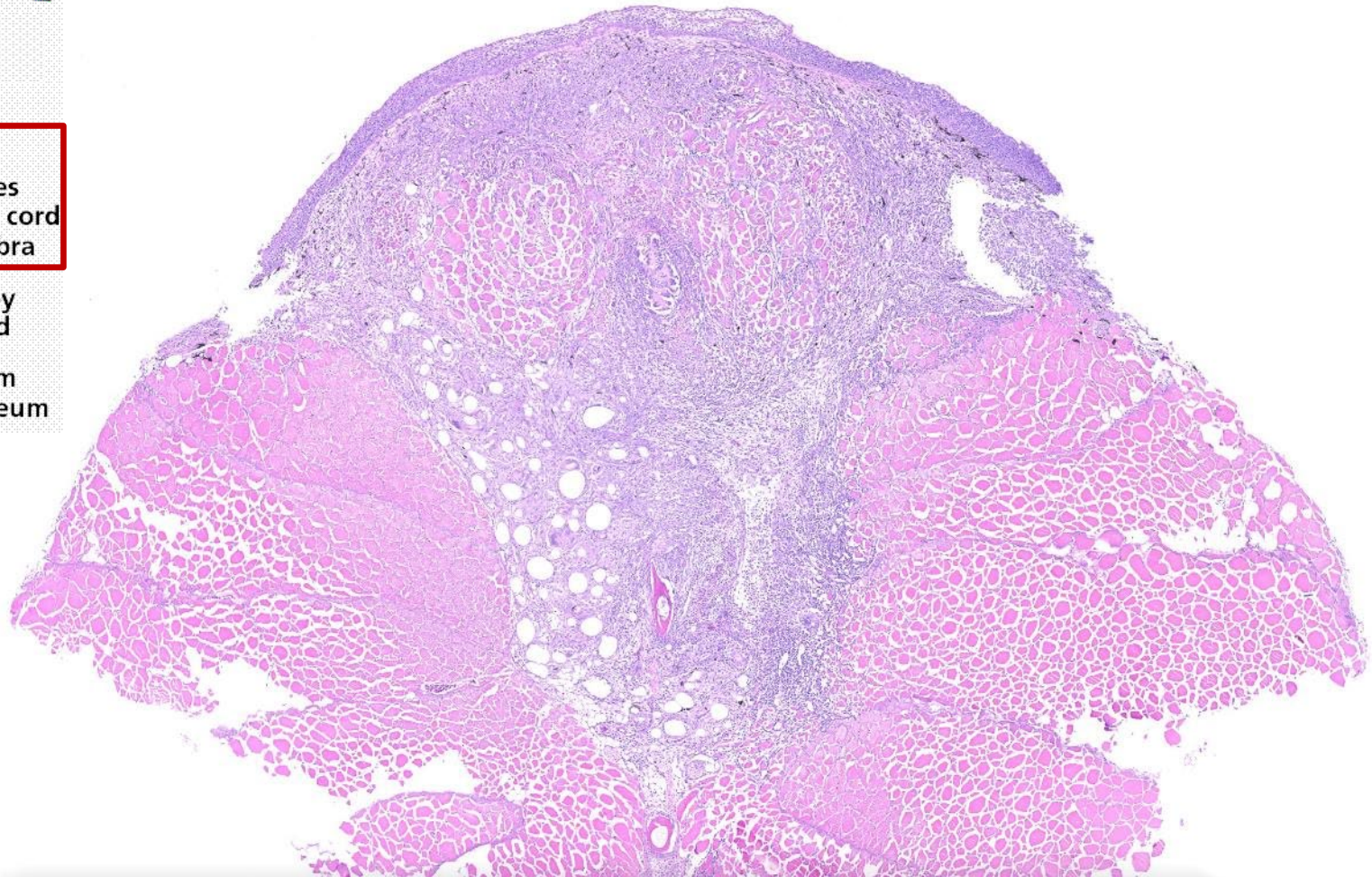
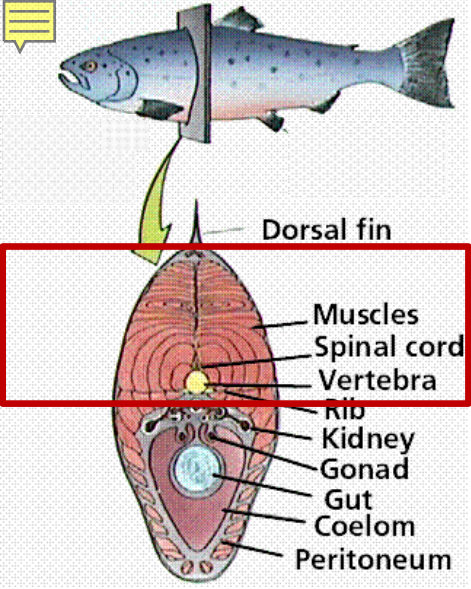
- The clinician's differential diagnoses pre-laboratory testing -Sunburn, steatitis, Flavobacterial infection, and nipping by cohorts.
- Samples collected and submitted to laboratory – Three affected fish were euthanized and tissue which included normal and affected skin and muscle was preserved in 10% buffered formalin and shipped to WADDL.

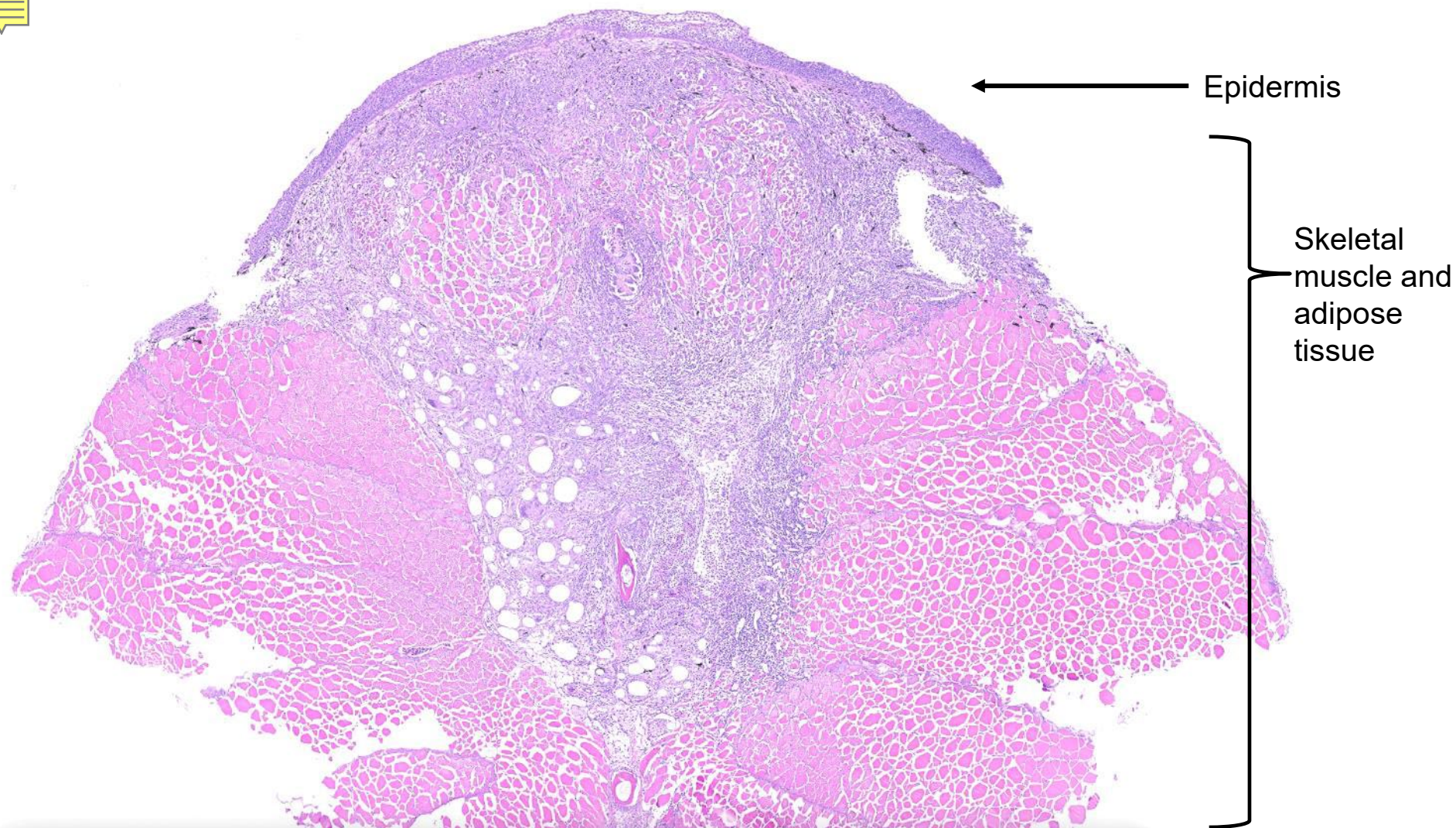


Histopathology



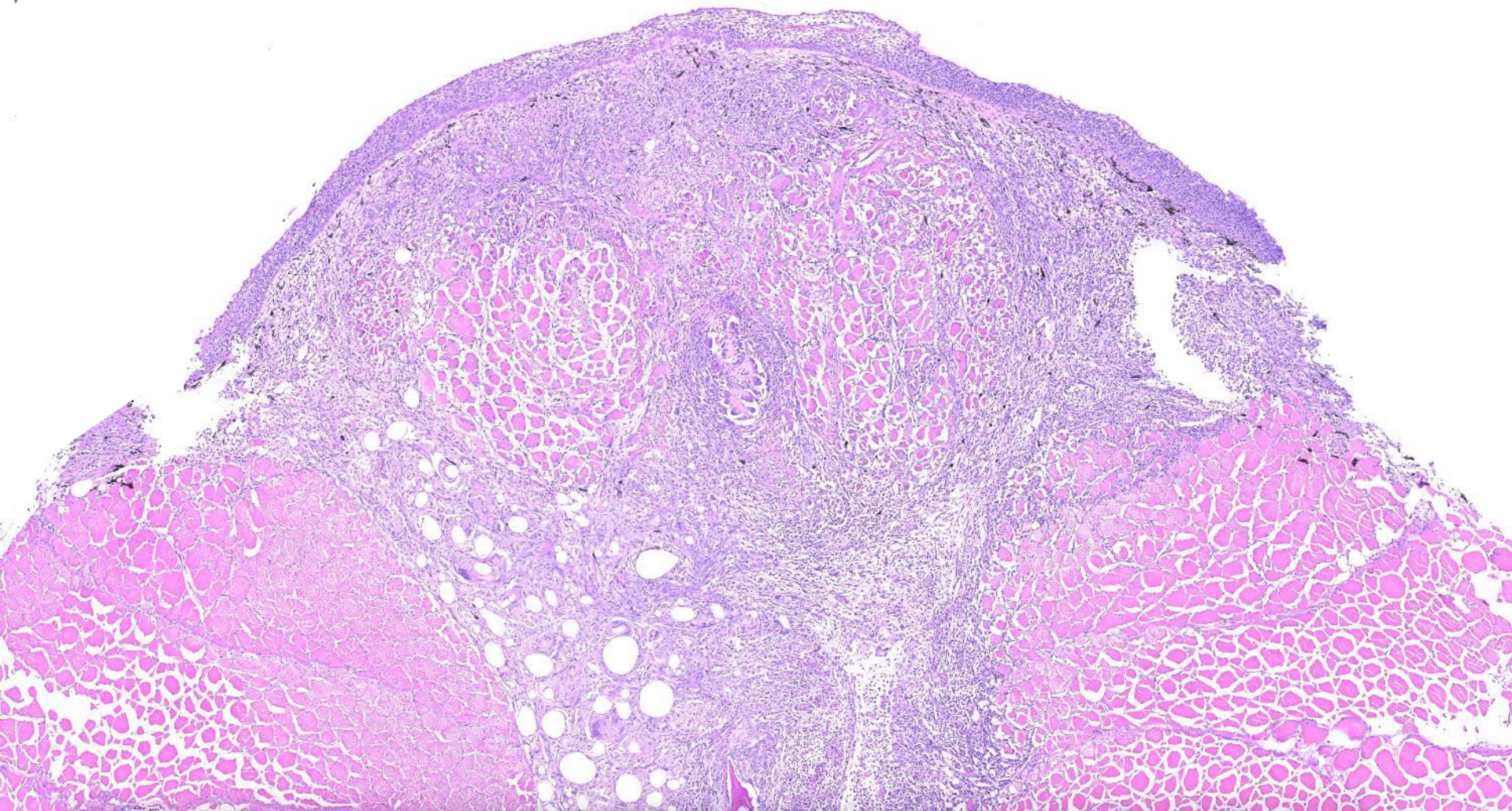


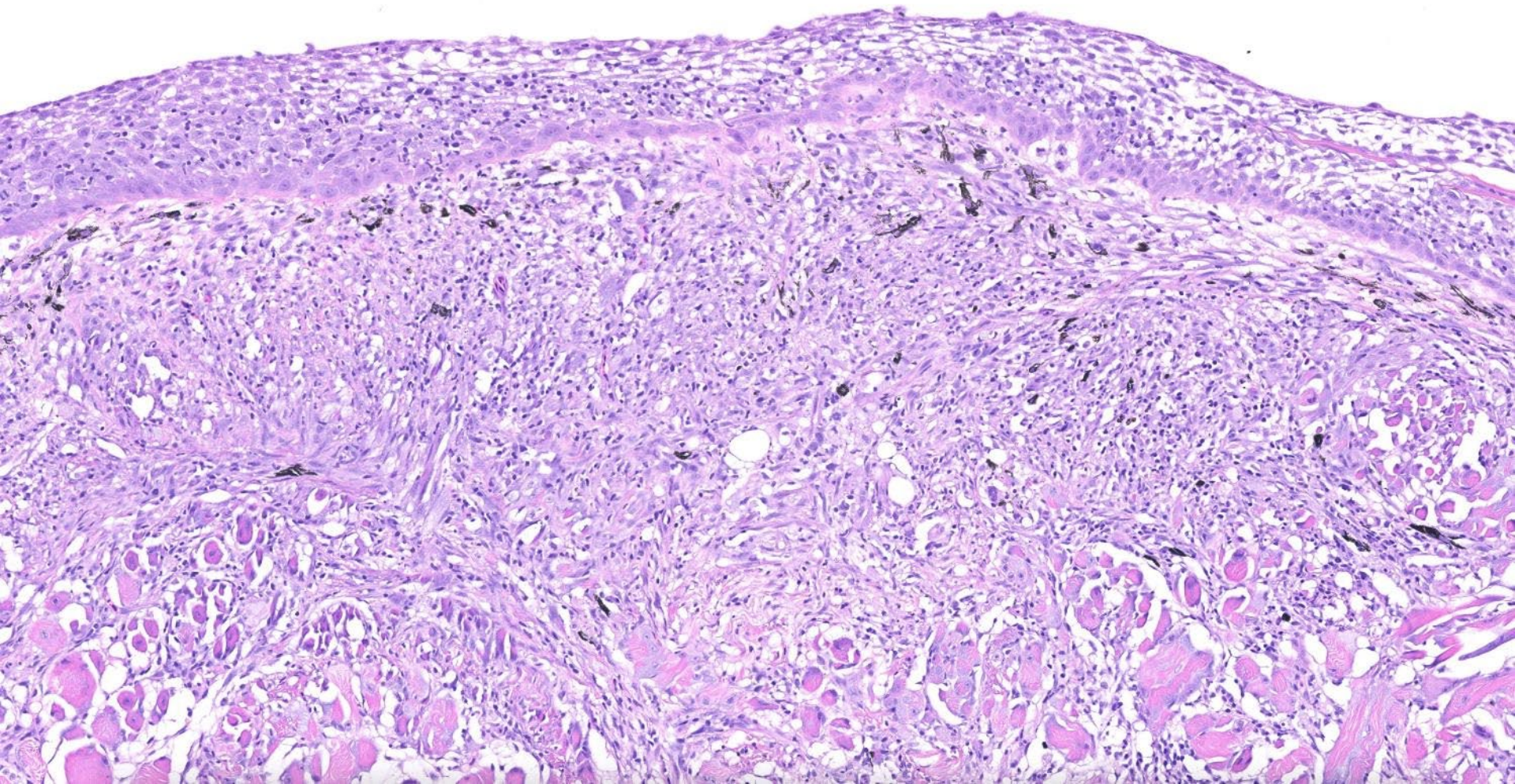


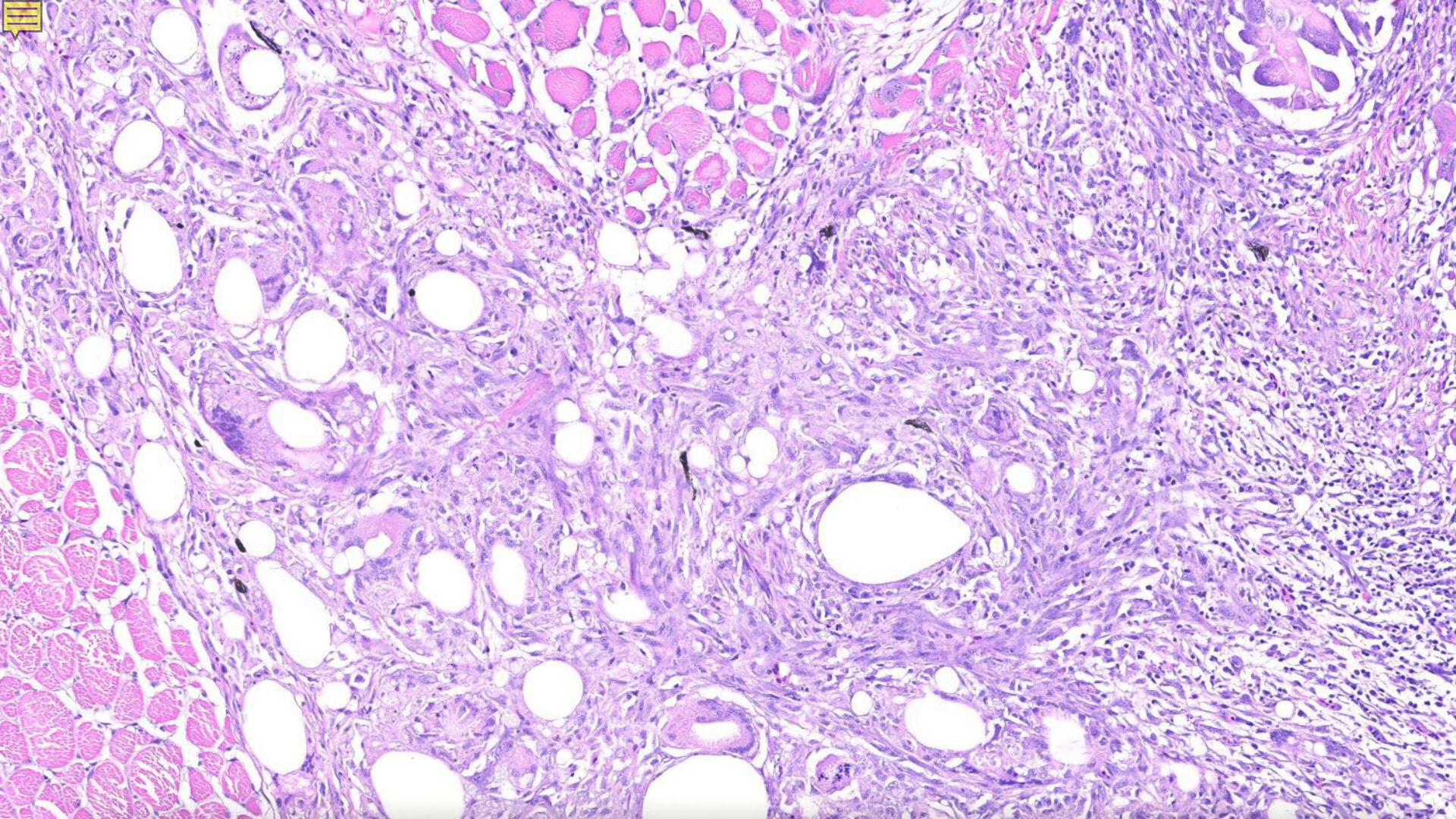


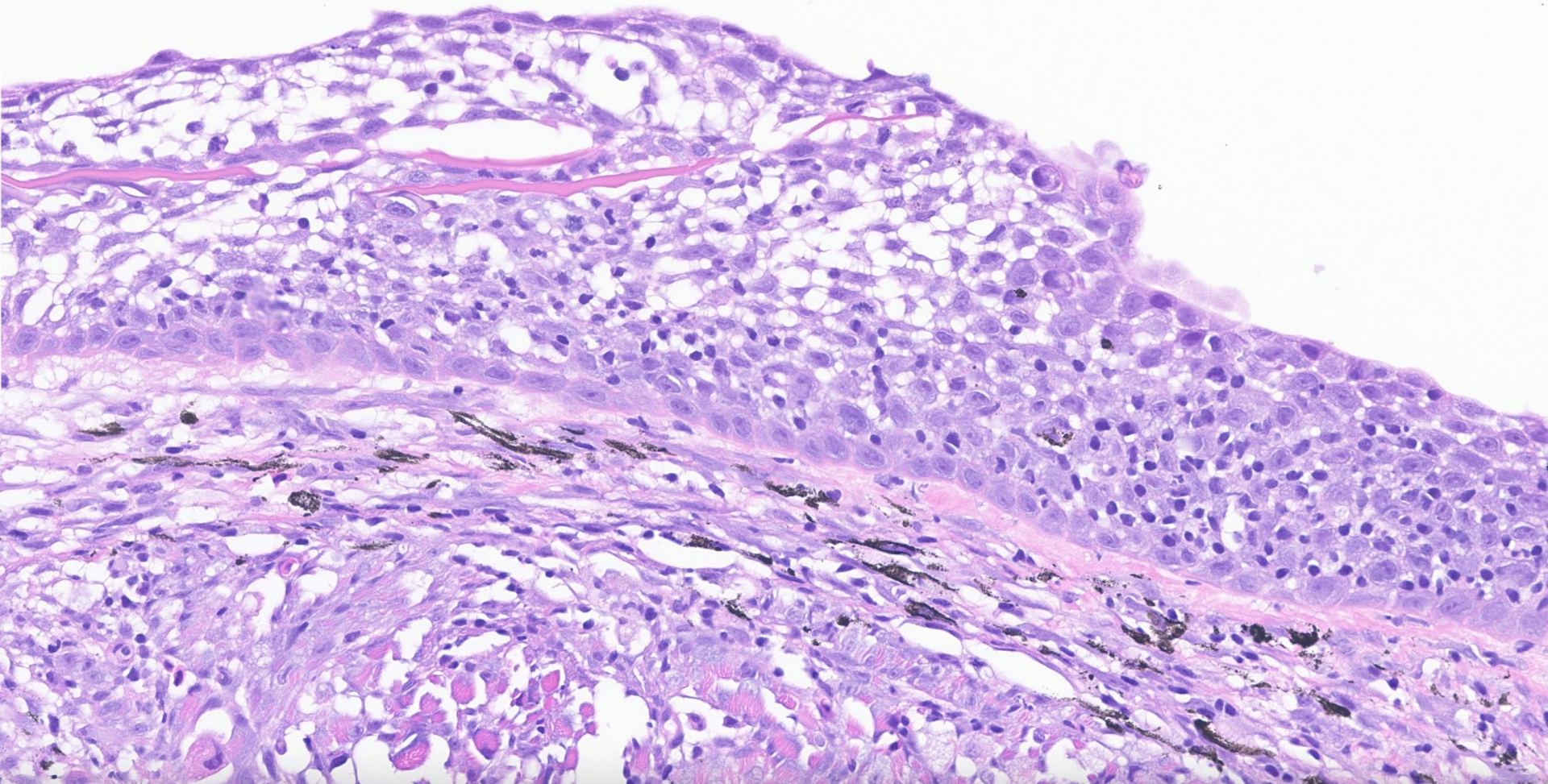
← Epidermis

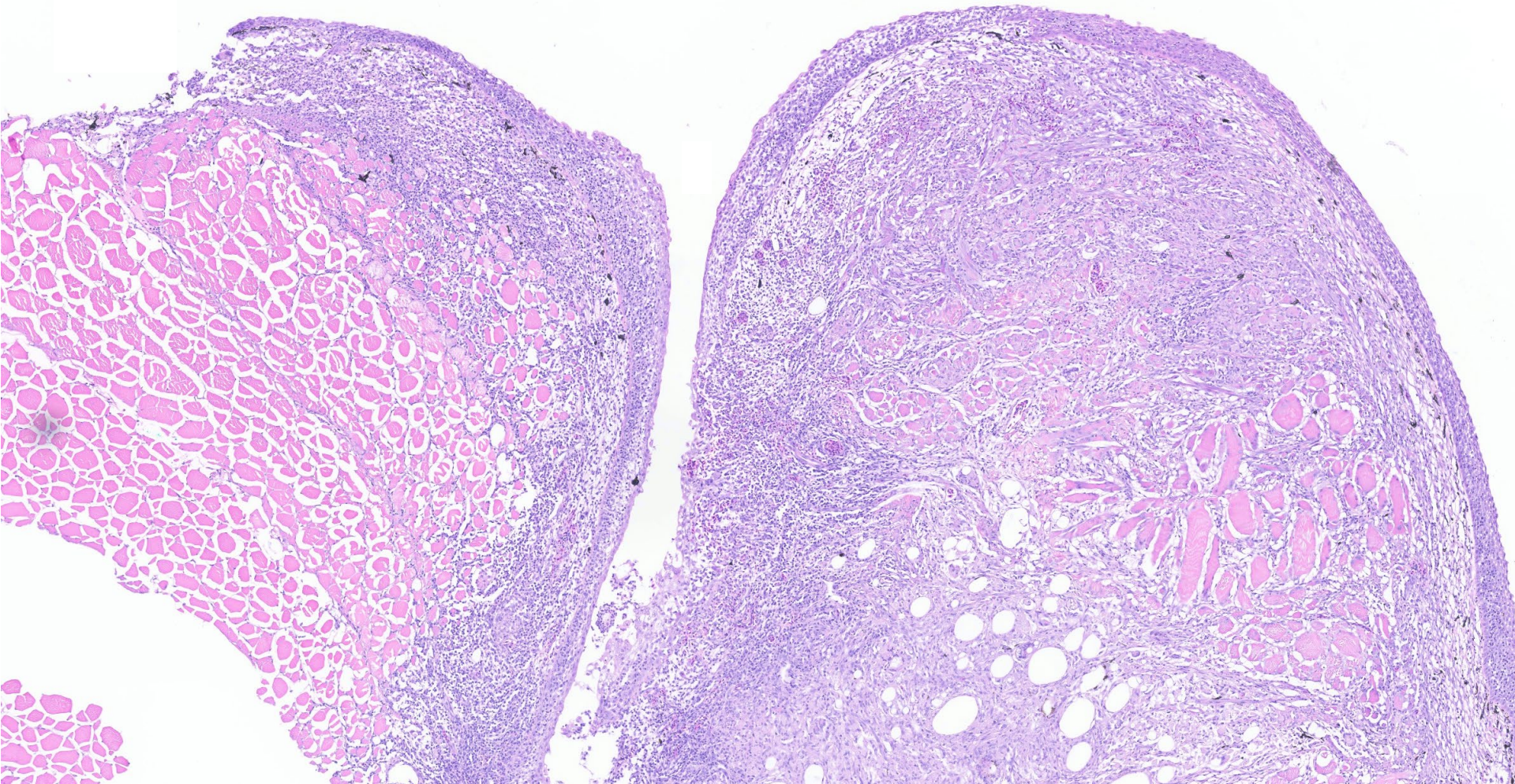
Skeletal
muscle and
adipose
tissue

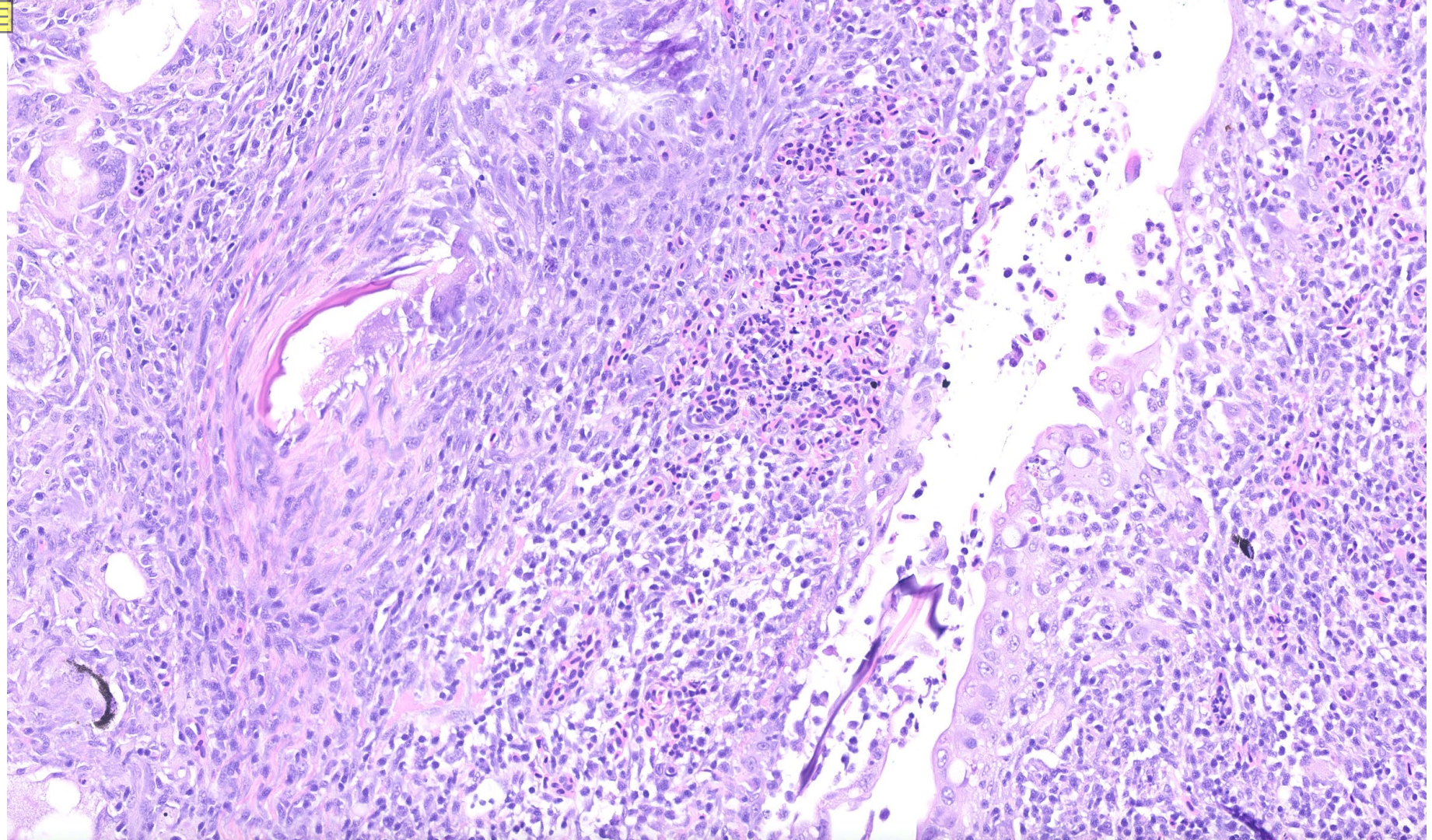


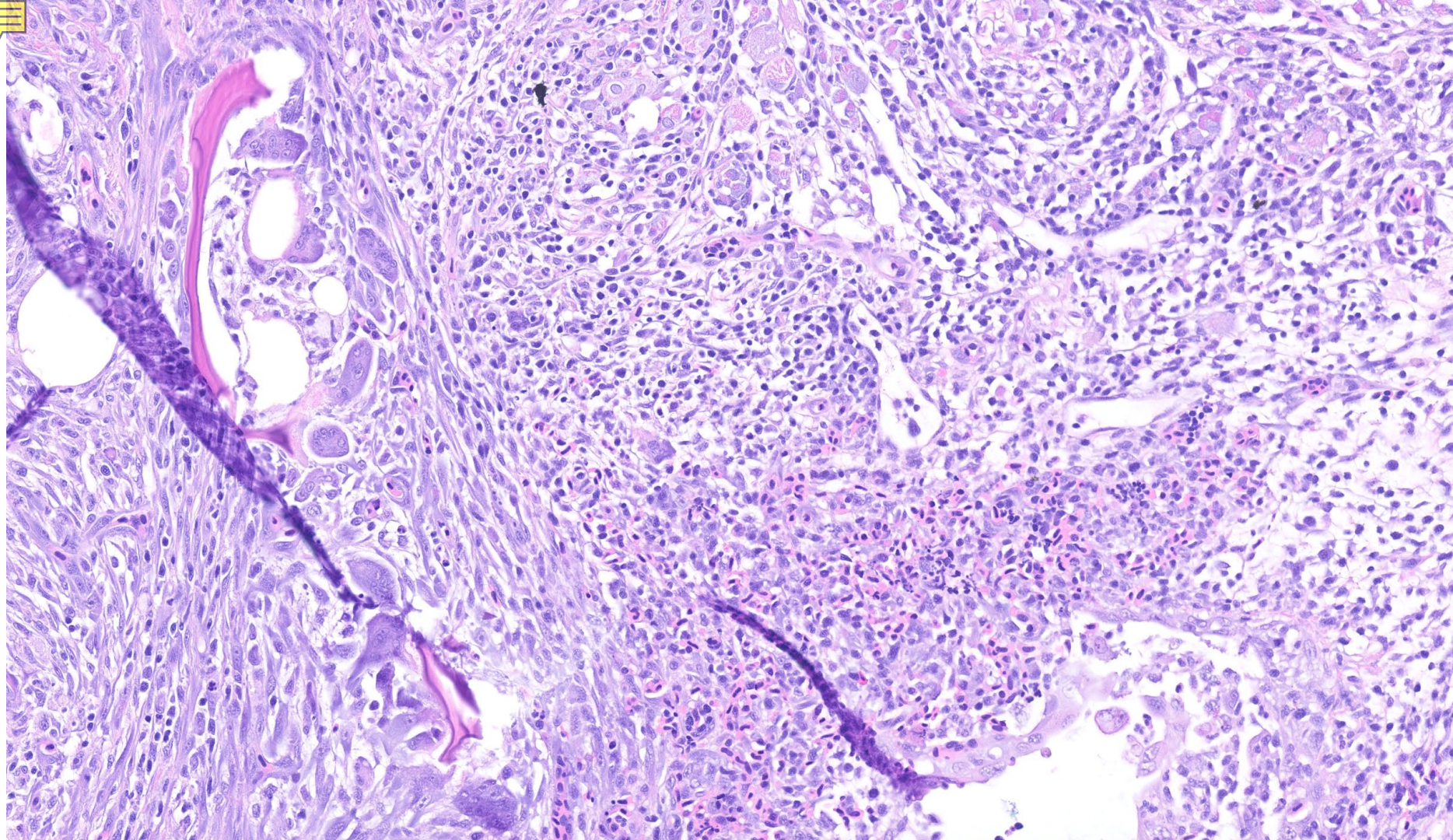








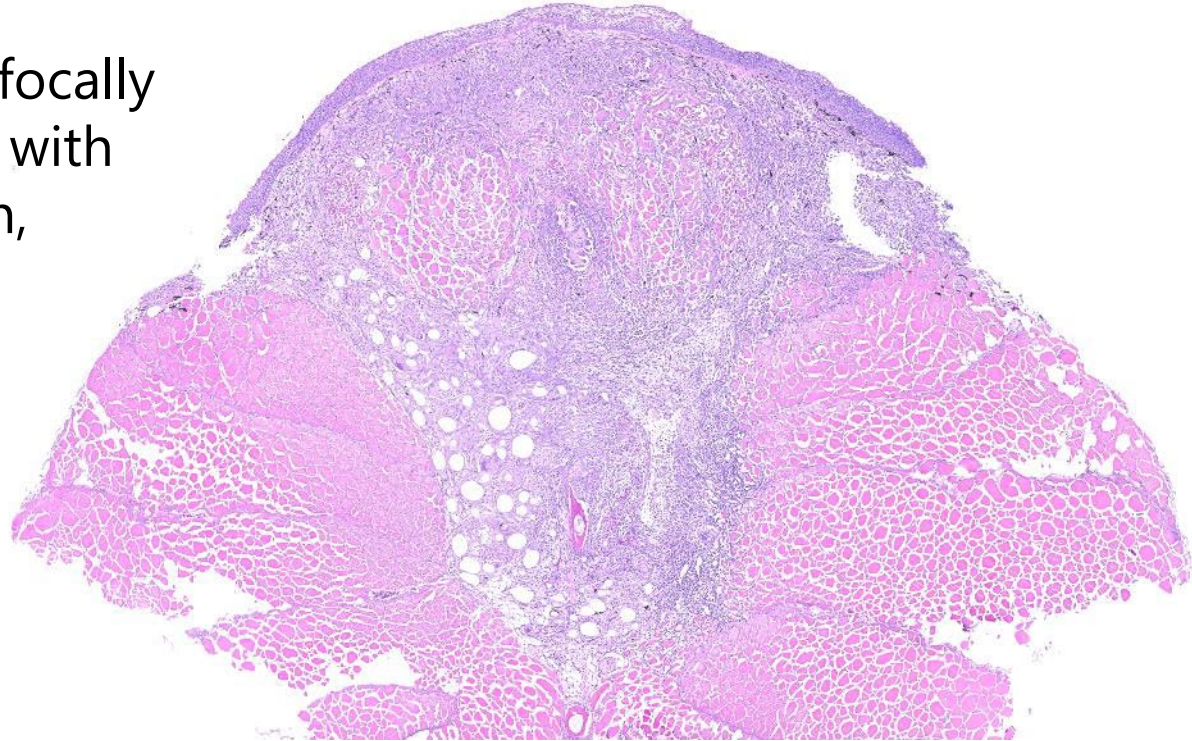




Histologic Diagnosis

Dorsal fat pad:

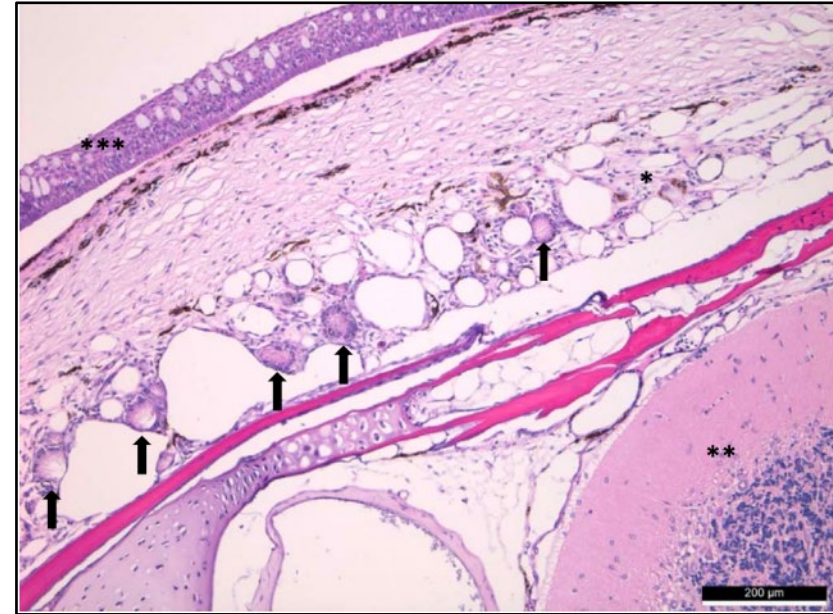
Steatitis, granulomatous, focally extensive, severe, chronic with fibrosis, myodegeneration, dermatitis, and epidermal hyperplasia (3/3 fish)





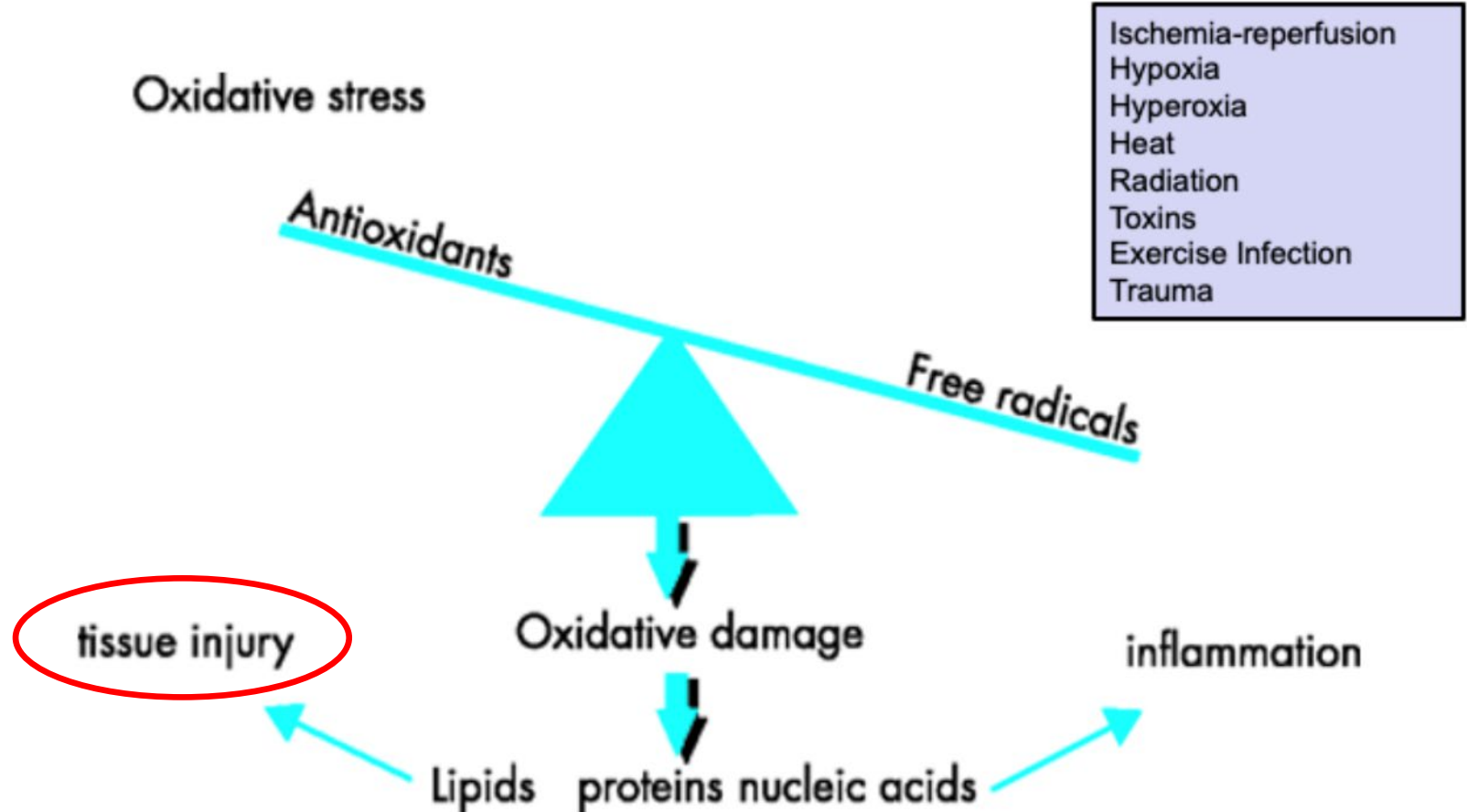
Steatitis

- Associated with dietary exposure to rancid fats
- Reduction in tissue vitamin E levels and generation of free radicals
- Free radicals cause significant tissue damage
- Excess UV light exposure may also be a contributing factor
- Other signs include reduced growth, erratic swimming, increased mortality, skin lesions and fin erosion



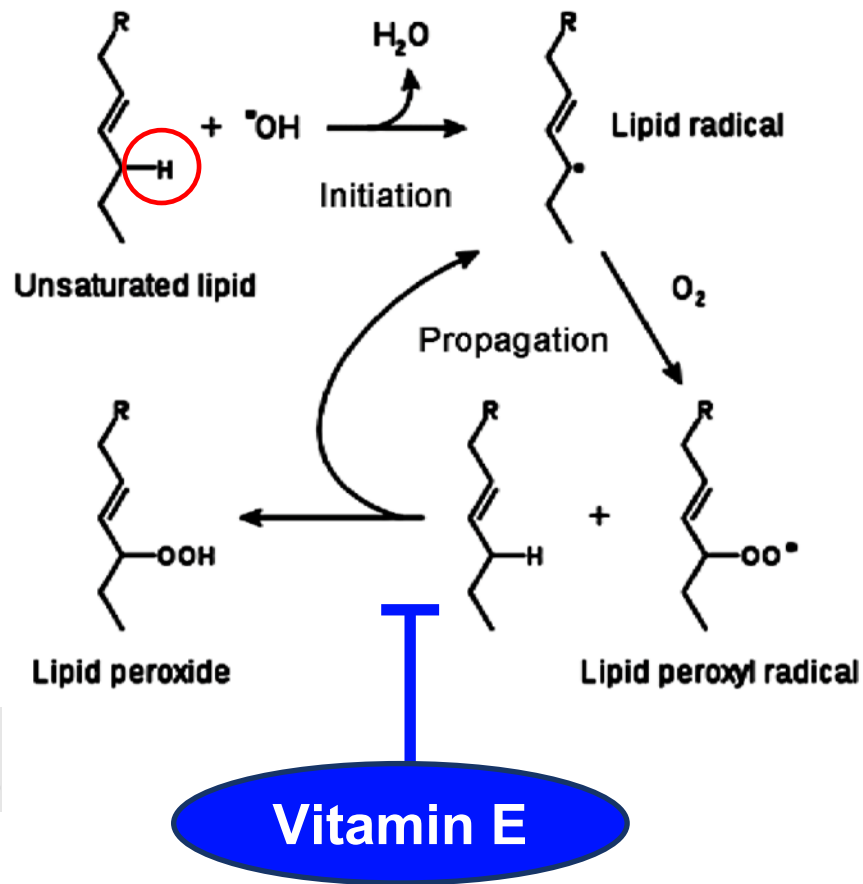
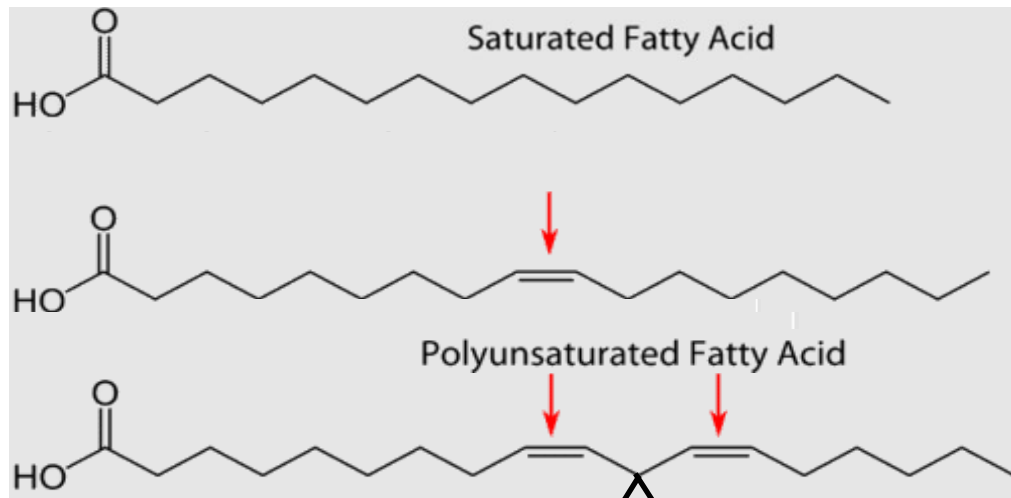
Granulomas in subcutaneous fat indicative of steatitis in steelhead fed oxidized fish oil and exposed to ultraviolet light

Oxidative stress



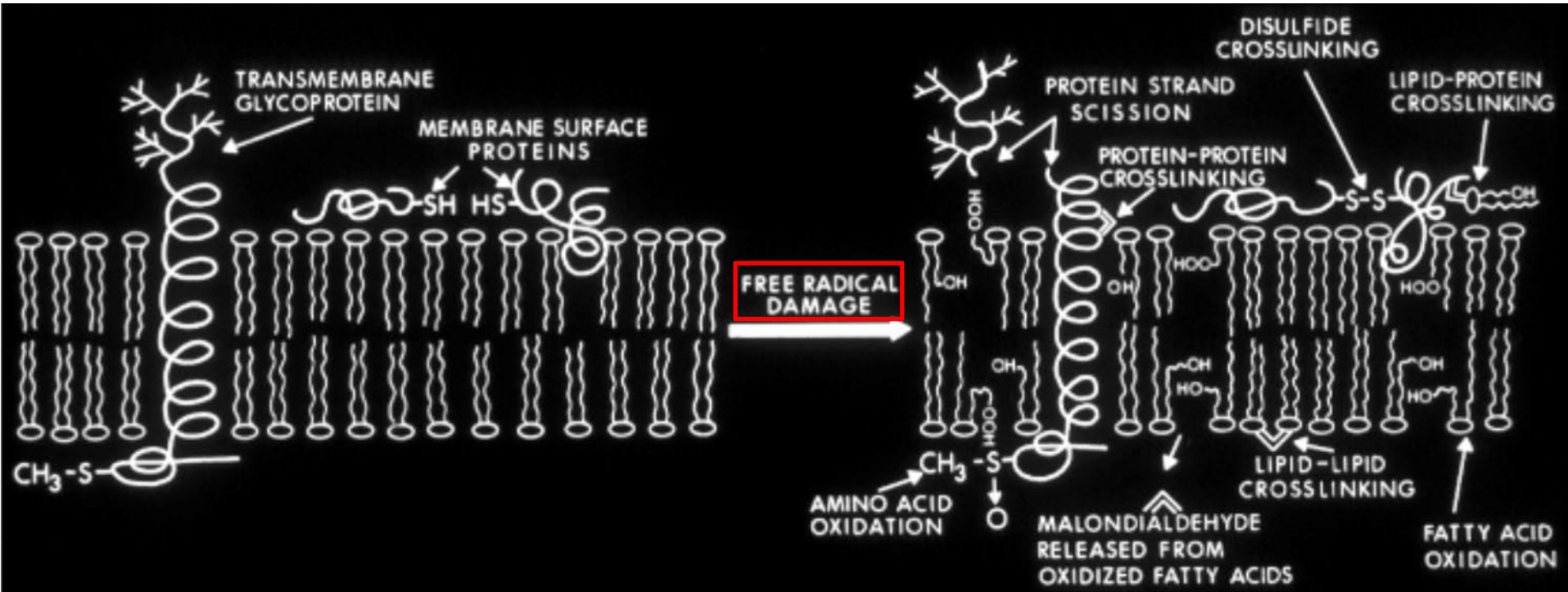
Lipid peroxidation

- Polyunsaturated fatty acids (PUFAs) are prone to peroxidation due to highly reactive hydrogen atoms





Oxidative damage to cellular membranes



Normal cell membrane

Oxidative damage



Effects of dietary lipid and light source on steatitis

- More severe steatitis scores in fish fed FO or OFO compared with fish fed CO and in fish exposed to UV light compared with fish exposed to fluorescent light

0 = no steatitis/within normal limits

1 = minimal steatitis (low numbers of granulomas in 1 location)

2 = mild steatitis (scattered granulomas in 2–3 locations)

3 = moderate steatitis (multifocal to coalescing granulomas in 1 location)

4 = moderate to severe steatitis (coalescing granulomas in 2–3 locations)

5 = severe steatitis (numerous granulomas in > 3 locations)

Table 4

Mean growth responses and median steatitis scores of steelhead fed different dietary lipids and exposed to different light sources.

Response	Supplemental lipid source			Light source	
	Canola	Control fish oil	Oxidized fish oil	Fluorescent	UV ^a
Initial weight (g/fish)	1.7	1.6	1.6	1.7	1.6
Weight gain (%)	404.7	427.5	434.1	427.2	417.0
Final weight (g/fish)	8.5	8.5	8.8	8.7	8.5
Feed intake (% body weight/day)	2.2	2.2	2.1	2.1	2.1
Feed efficiency (g weight gain/g feed)	1.3	1.3	1.3	1.3	1.3
Survival (%)	98.4	97.3	99.0	97.8	98.7
Steatitis score	0b	1.5a	1.5a	1b	3a



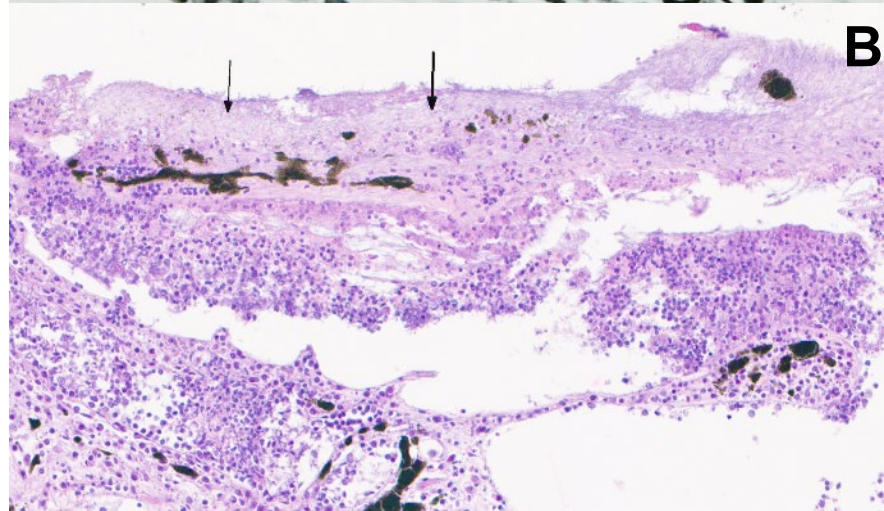
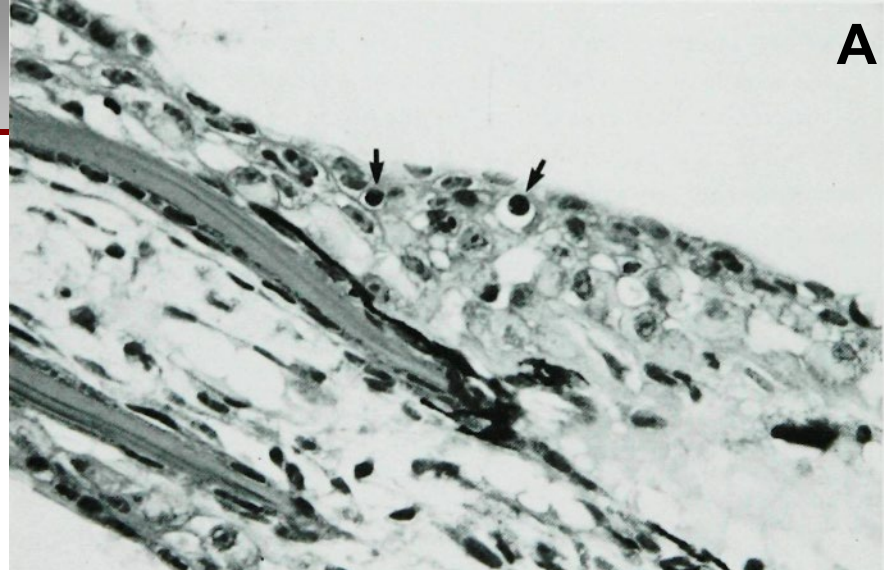
Differential Diagnoses

Non-infectious

- Sunburn (A)

Infectious

- *Flavobacterium columnare* (B),
F. psychrophilum, *Aeromonas*,
Pseudomonas, etc.



Top: Bullock, A. M., and R. J. Roberts. "Sunburn lesions in salmonid fry: a clinical and histological report." *Journal of Fish Diseases* 4.3 (1981).

Bottom: Wednesday Slide Conference 2019-2020, Conference 6, Case I

Clinician's Actions

- What the clinician did with the laboratory results –The clinician discussed the significance of the laboratory results with the producer, and the value of submitting for histopathology in this case.
- The producer asked whether the fish that had been affected and survived would still have white back lesions when they were processed (18-20 months of age)? The clinician speculated that there would be partial recovery of the skin and muscle. Follow-up histopathology is planned.
- Three months after switching to a different/fresh feed the producer reported that he and his staff no longer see white back lesions on any trout.









Acknowledgements

- WADDL Aquatic Health Laboratory
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