

Evaluation of the Performance of Two Collagen Membranes: Histological Analysis

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Presenter: Peter Moy

Introduction:

A wide variety of biomaterials are available for bone grafting, as well as membranes used to protect the graft, which may originate from different donor sources and be either resorbable or non-resorbable. In this study, we evaluated the performance of a novel bovine-derived collagen membrane.

Methods:



(n = 36)

Control Group (CG) – xenograft + porcine membrane (n = 18):

- Euthanized 7 days (n = 6)
- Euthanized 28 days (n = 6)
- Euthanized 40 days (n = 6)

Test Group (TG) – xenograft + bovine membrane (n = 18):

- Euthanized 7 days (n = 6)
- Euthanized 28 days (n = 6)
- Euthanized 40 days (n = 6)

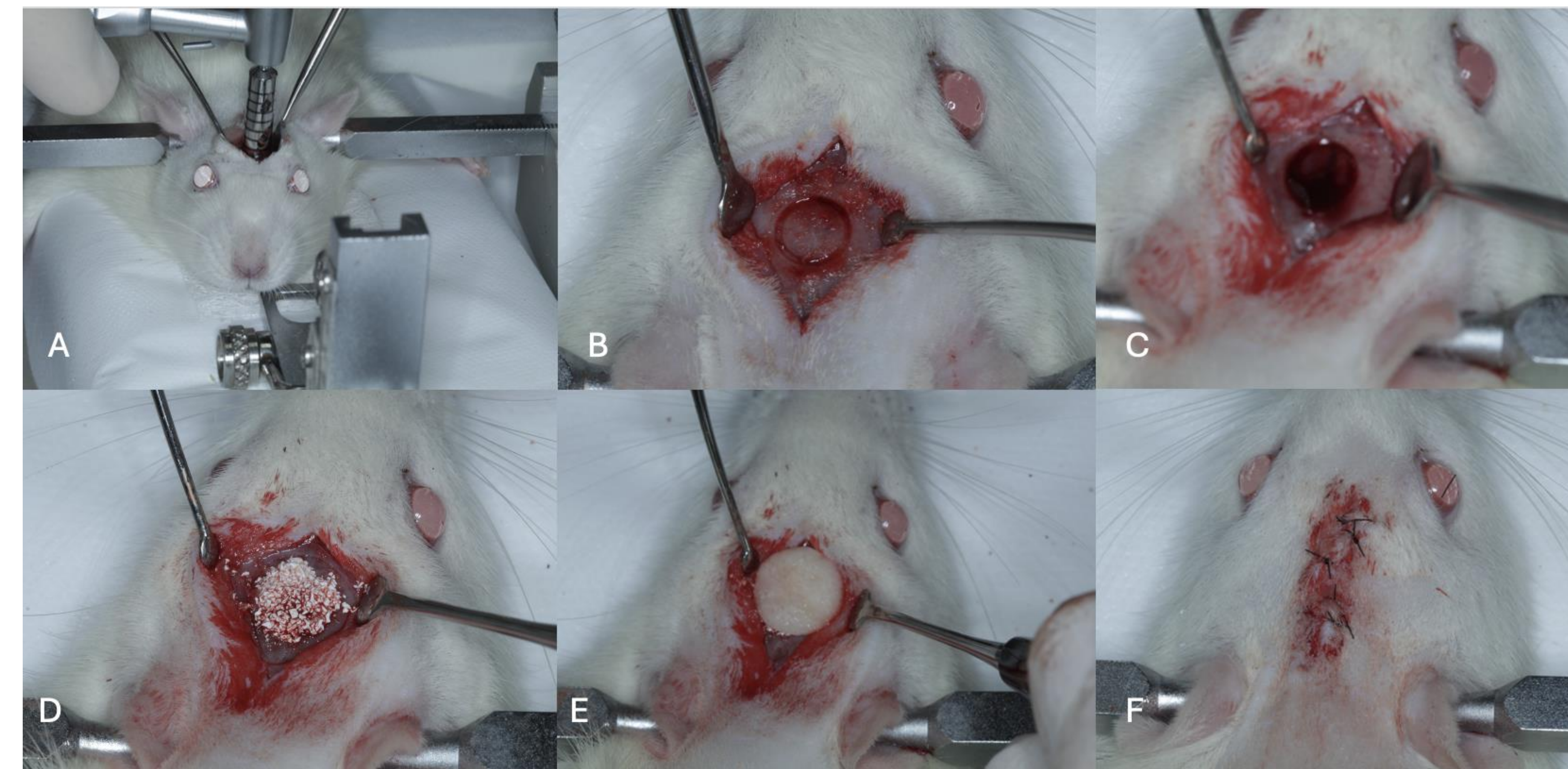


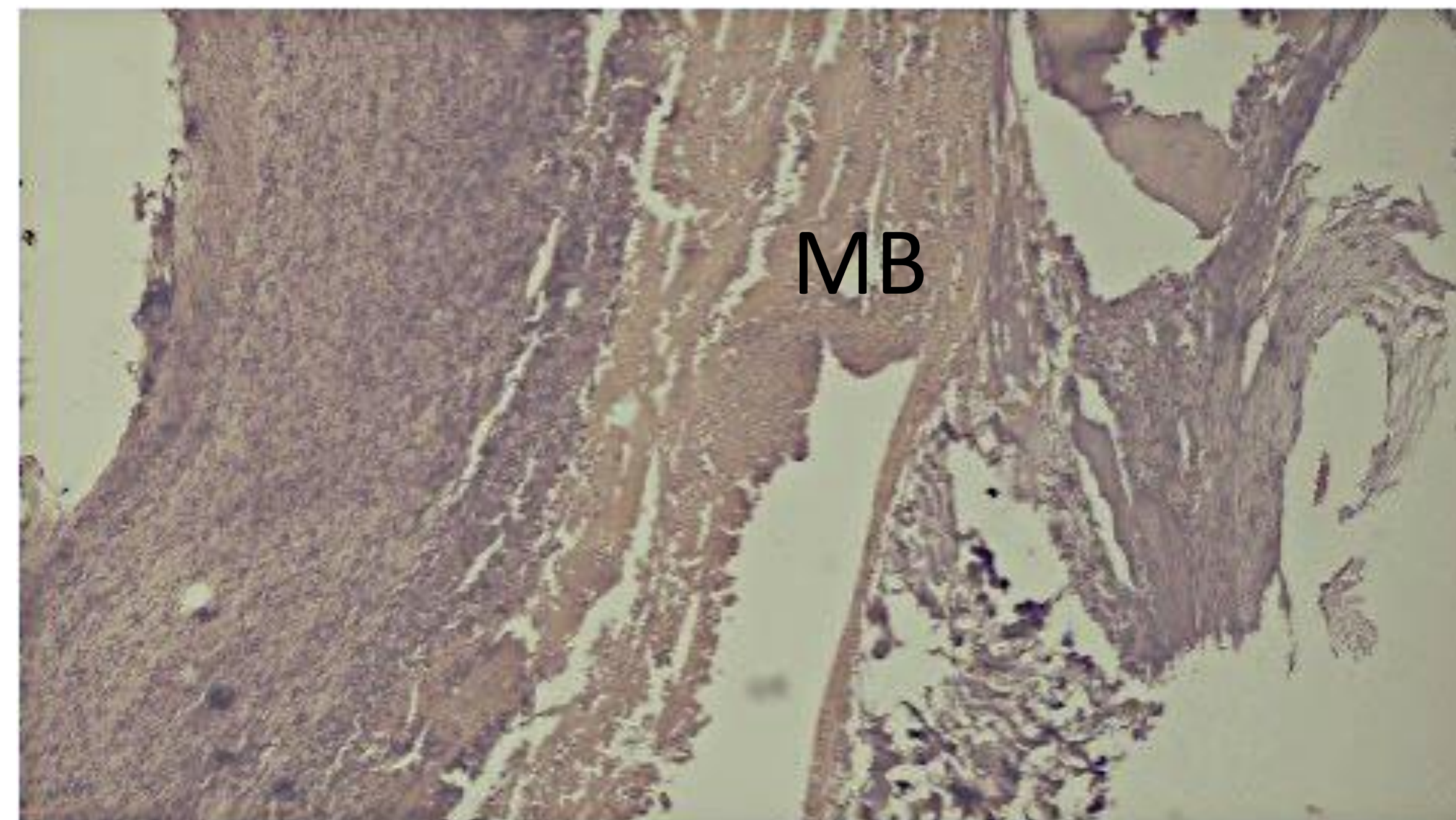
Figure 1. Creation of the critical size bone defect. (A) Use of a trephine bur; (B) Osteotomy created; (C) Removal of the diploe; (D) Placement of the xenograft; (E) Placement of the collagen membrane; (F) Suture.

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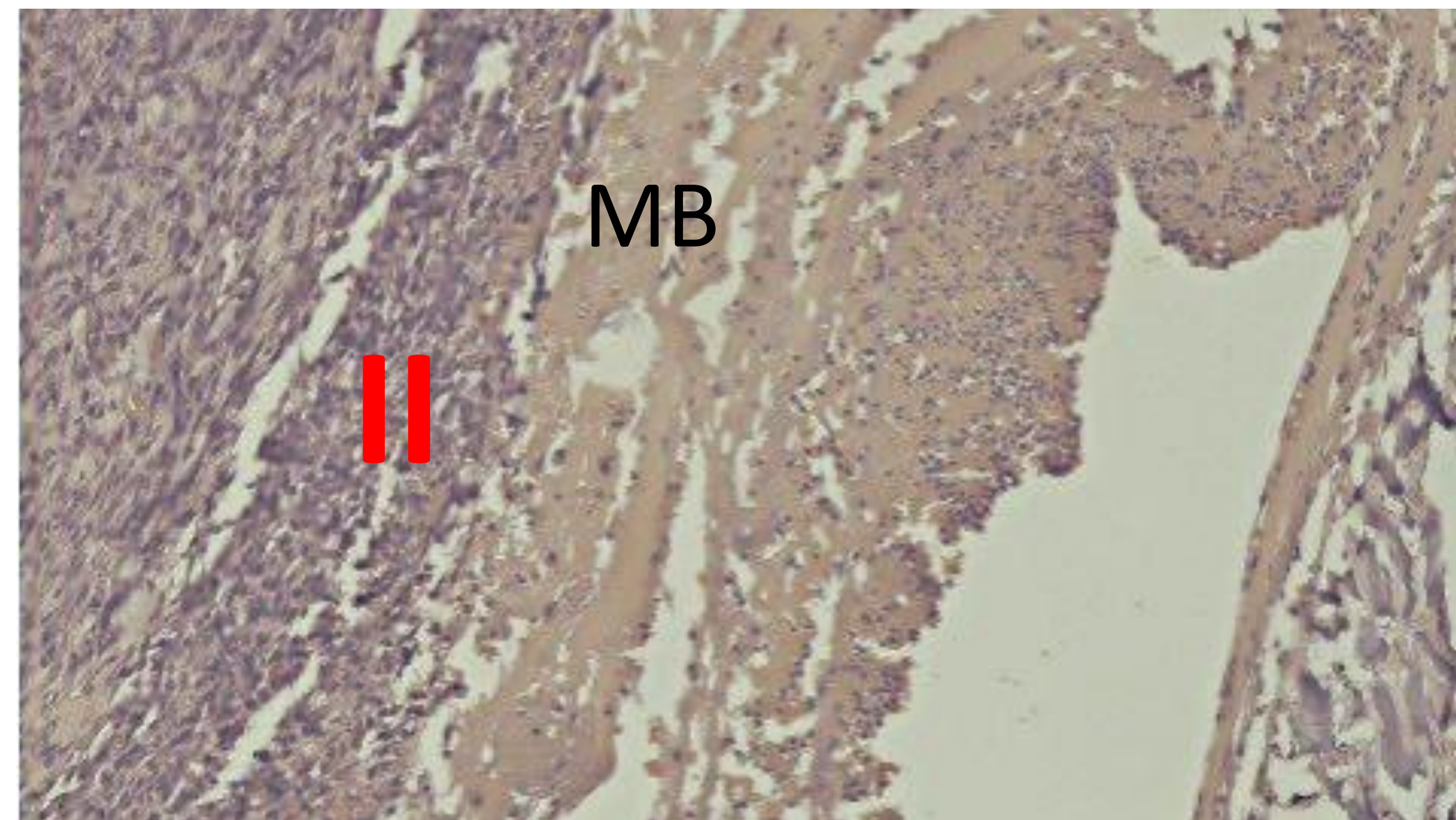
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Bio-Gide (CG)

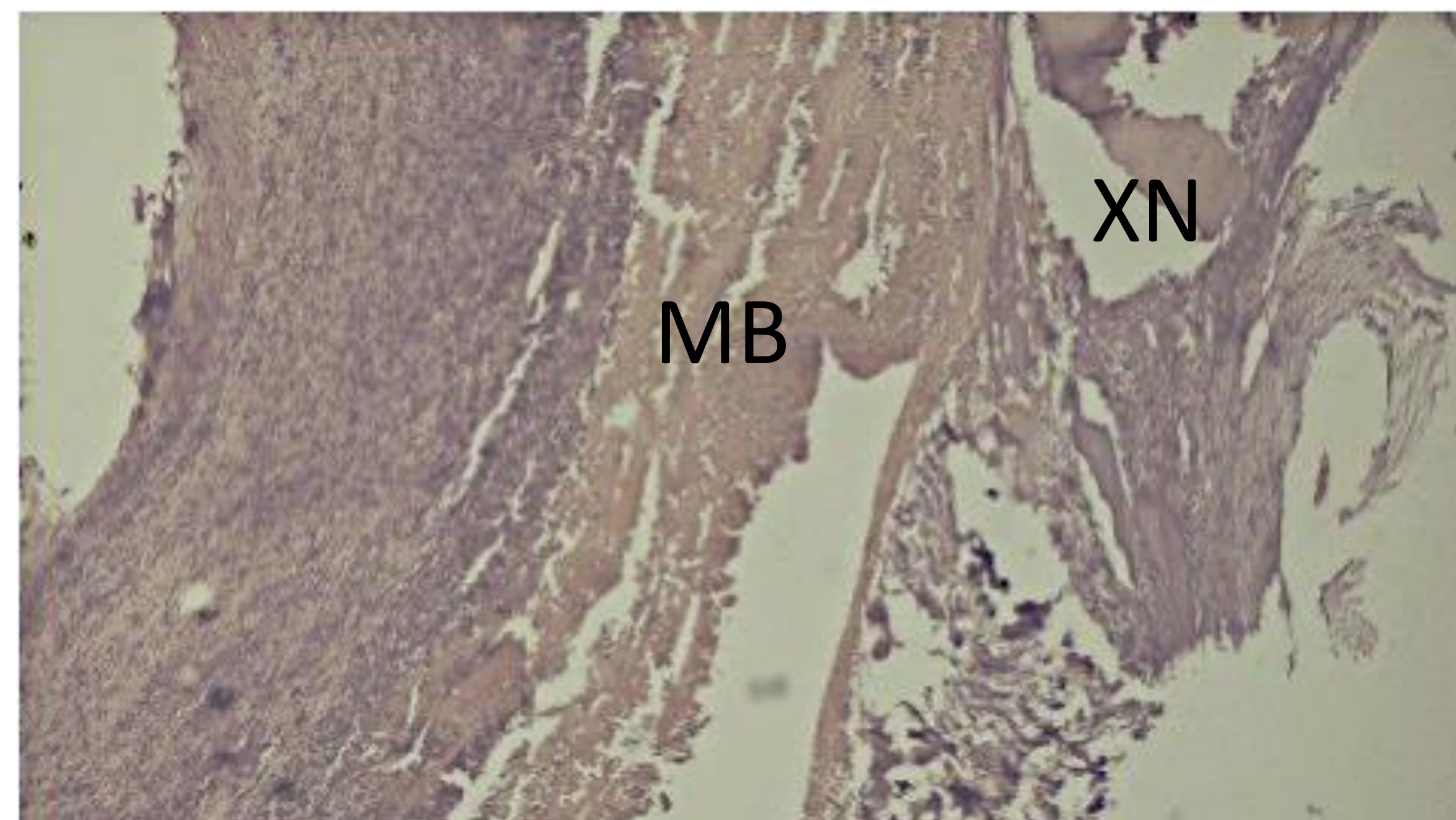
40x



100x



200x



7 days

**Equivalent Inflammatory
Infiltrate Over Membranes**

MB = membrane

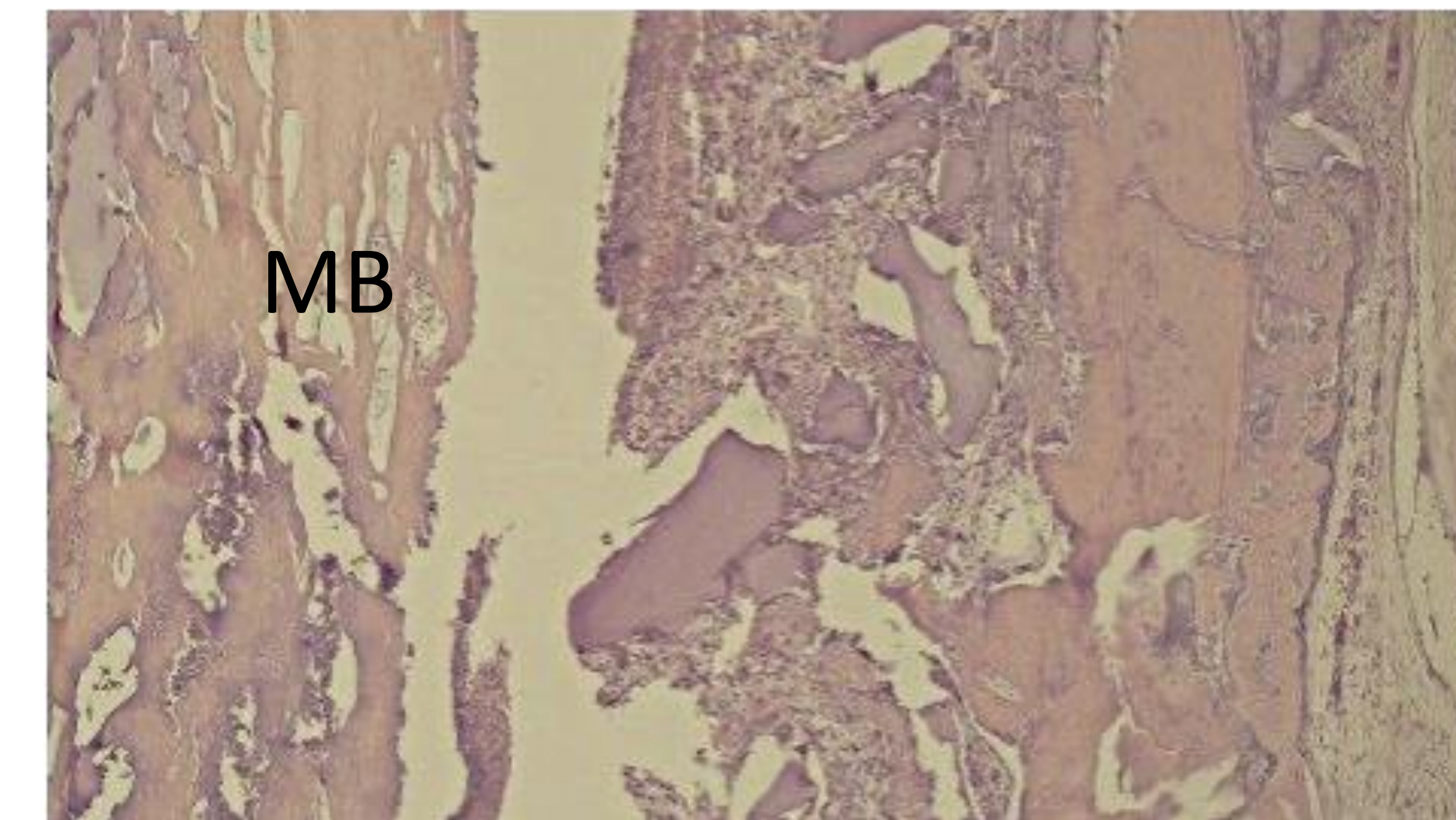
XN = xenograft

NB = new bone

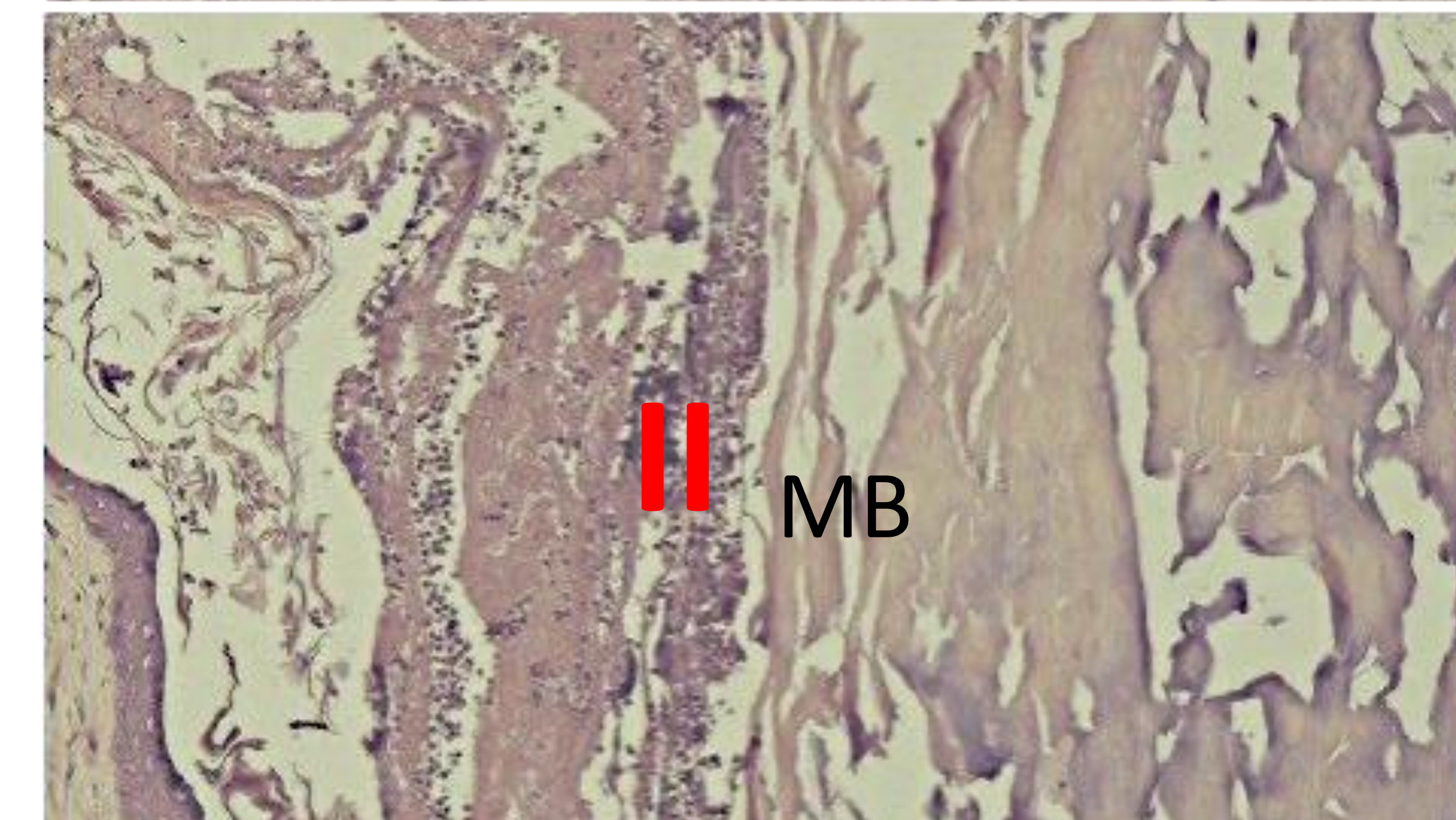
|| = Inflammatory infiltrate

Test Membrane (TG)

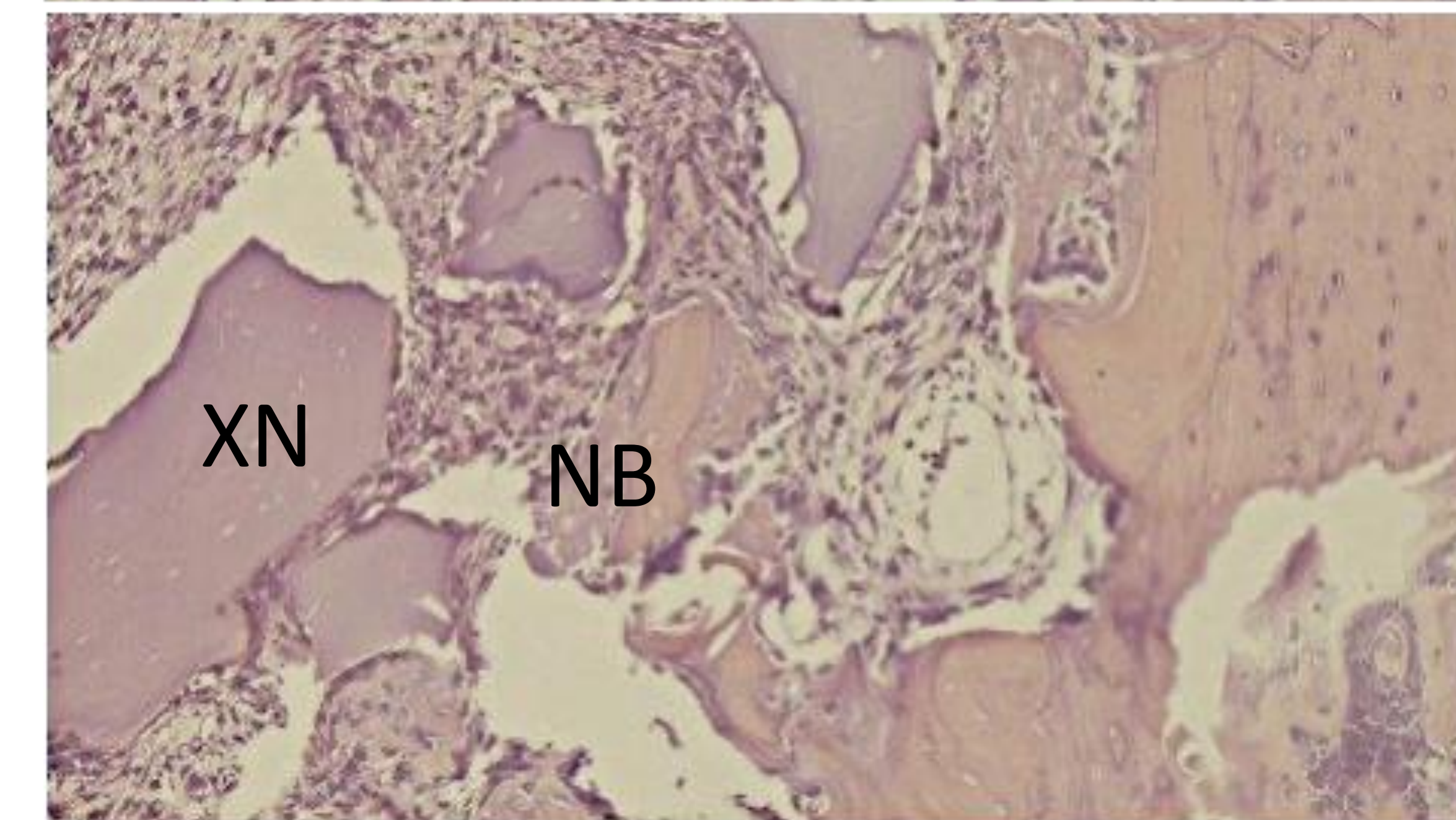
40x



100x



200x



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Bio-Gide (CG)

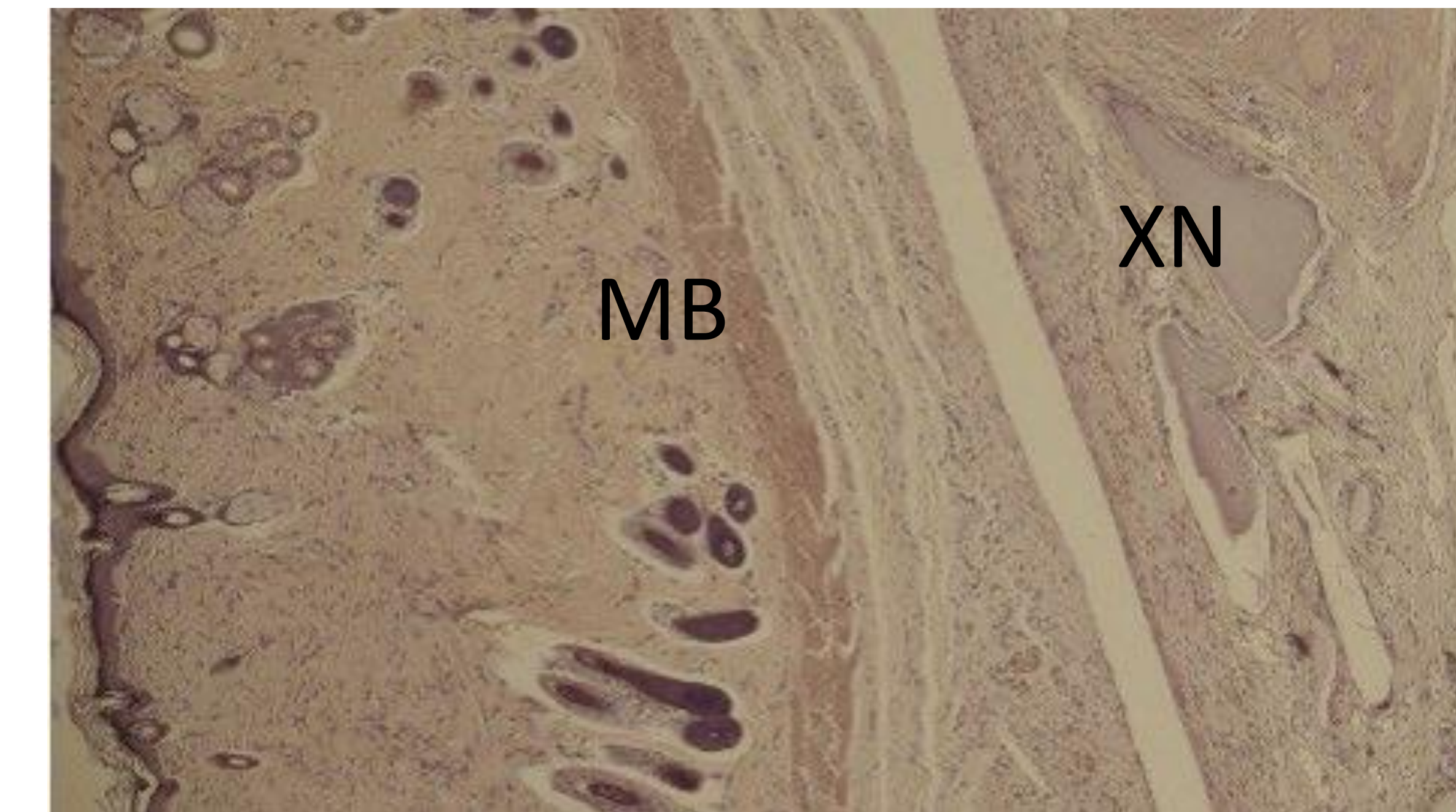
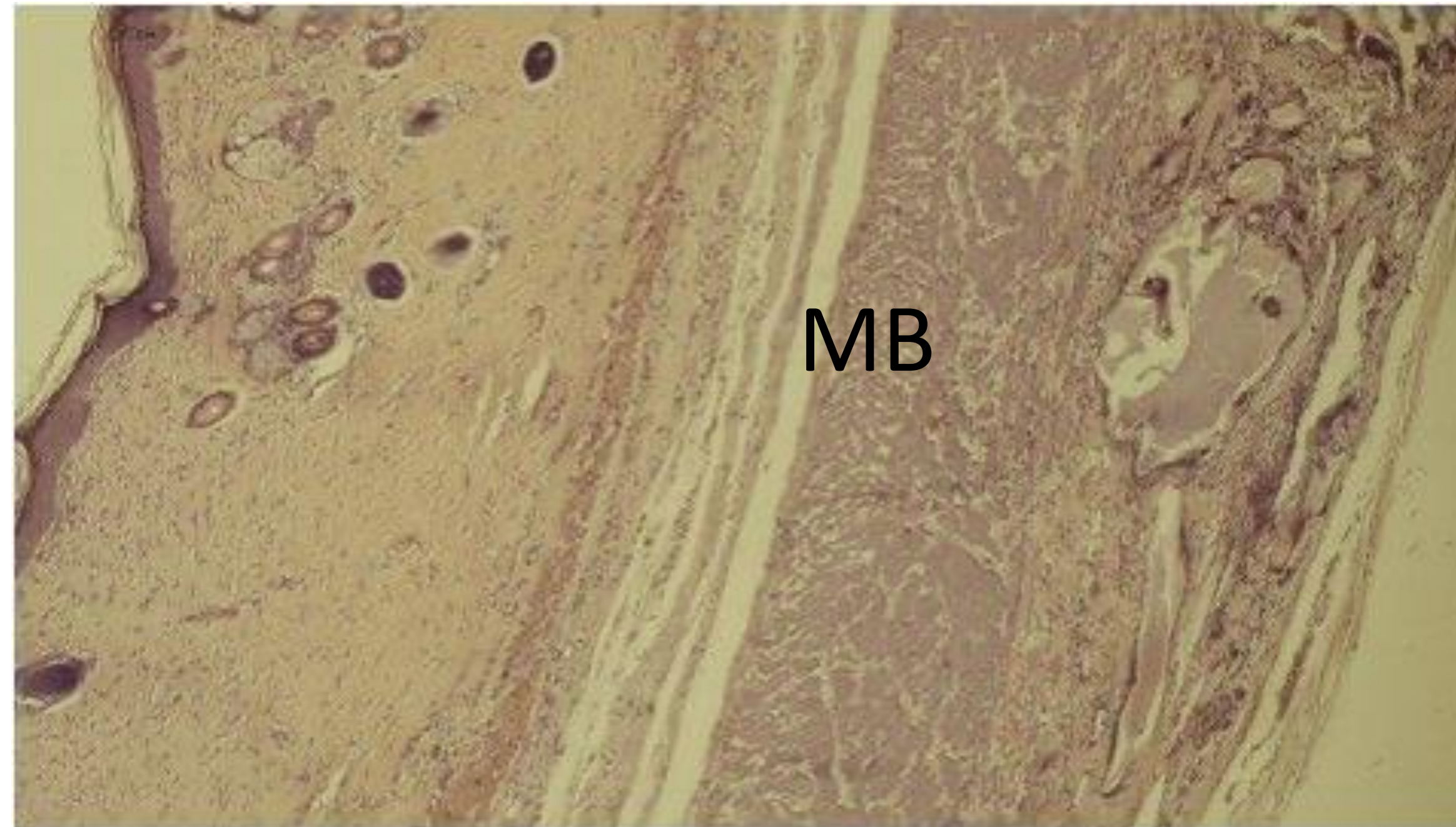
Test Membrane (TG)

28 days

Equivalent Bone Formation
No Inflammatory Infiltrate

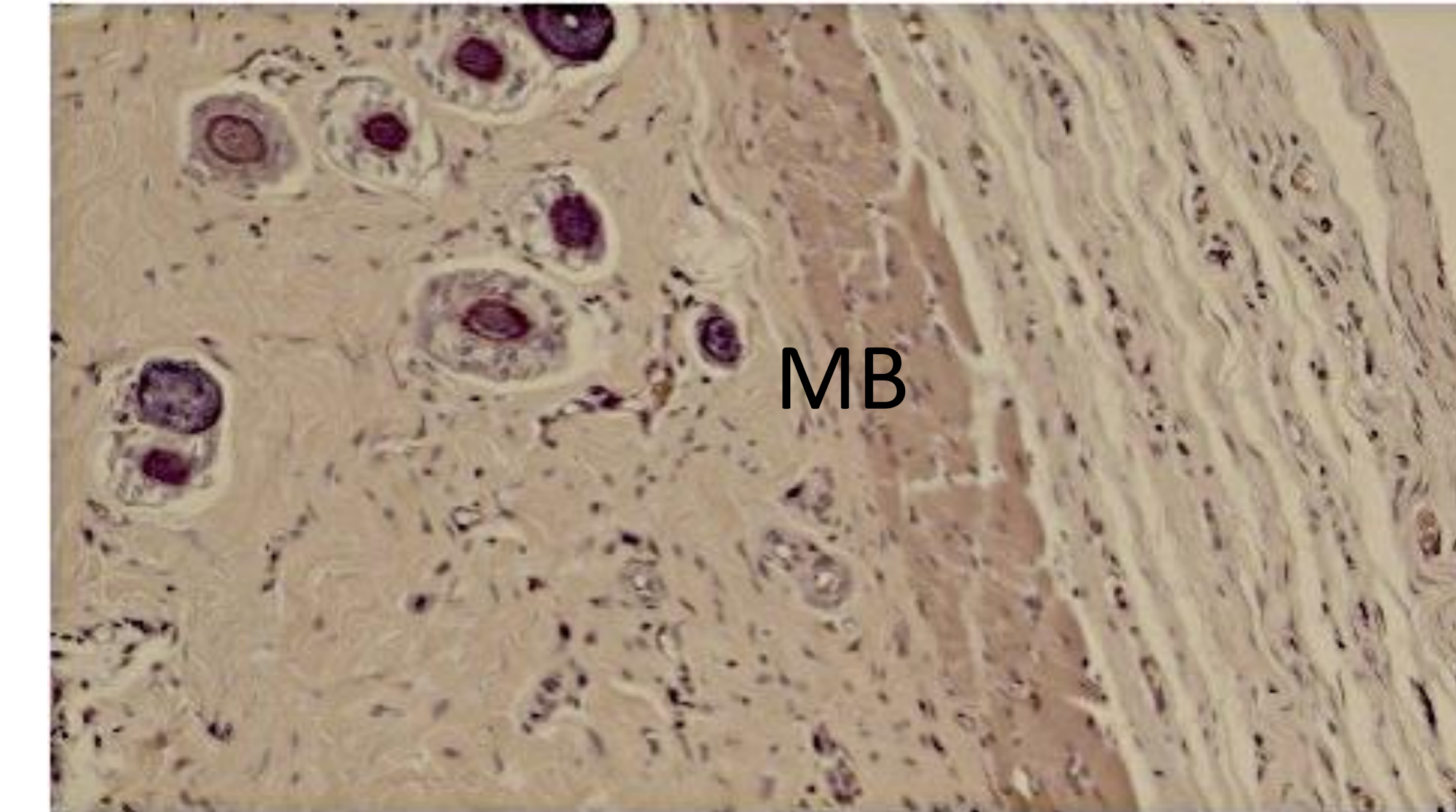
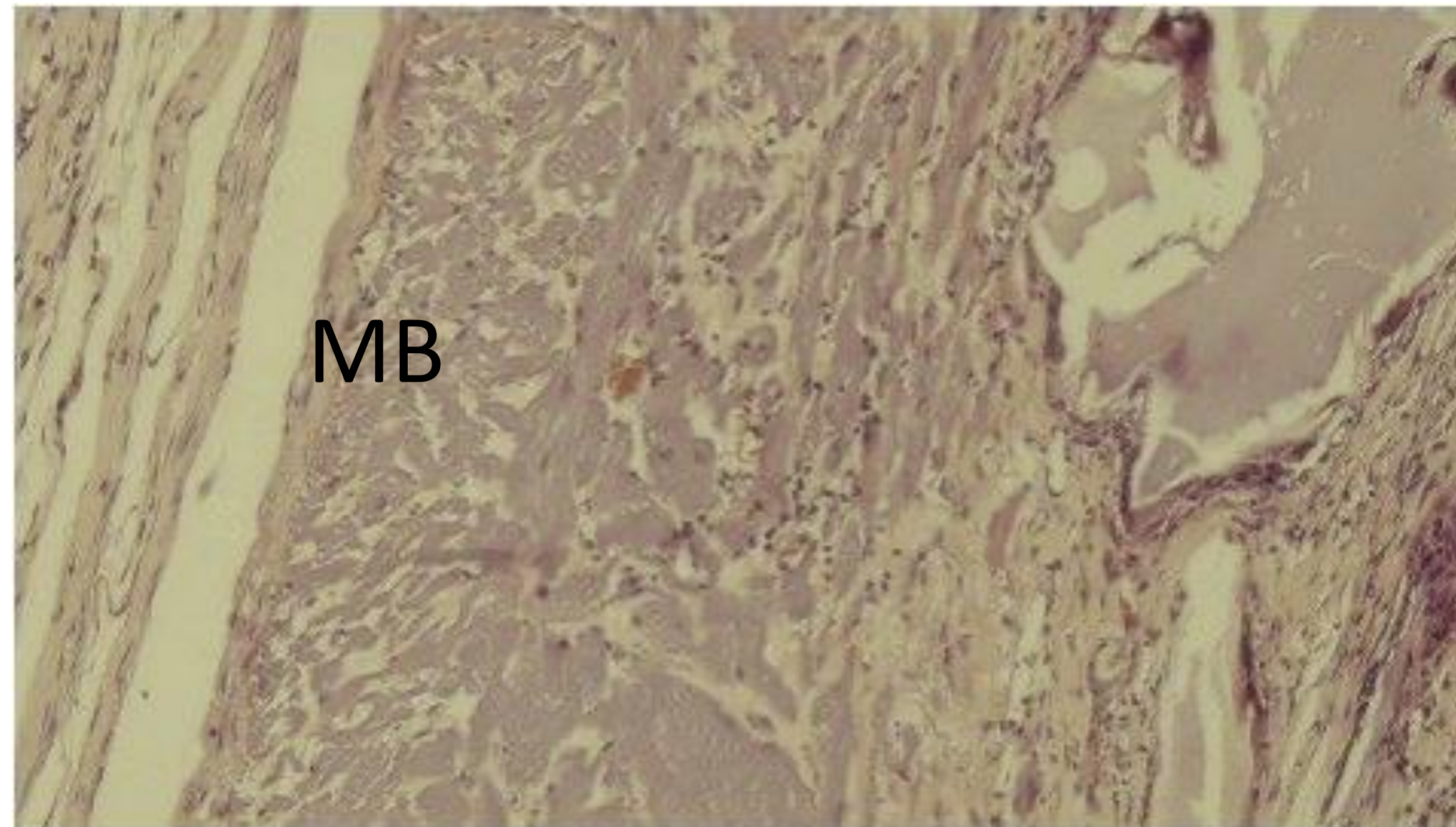
MB = membrane
XN = xenograft
NB = new bone

40x



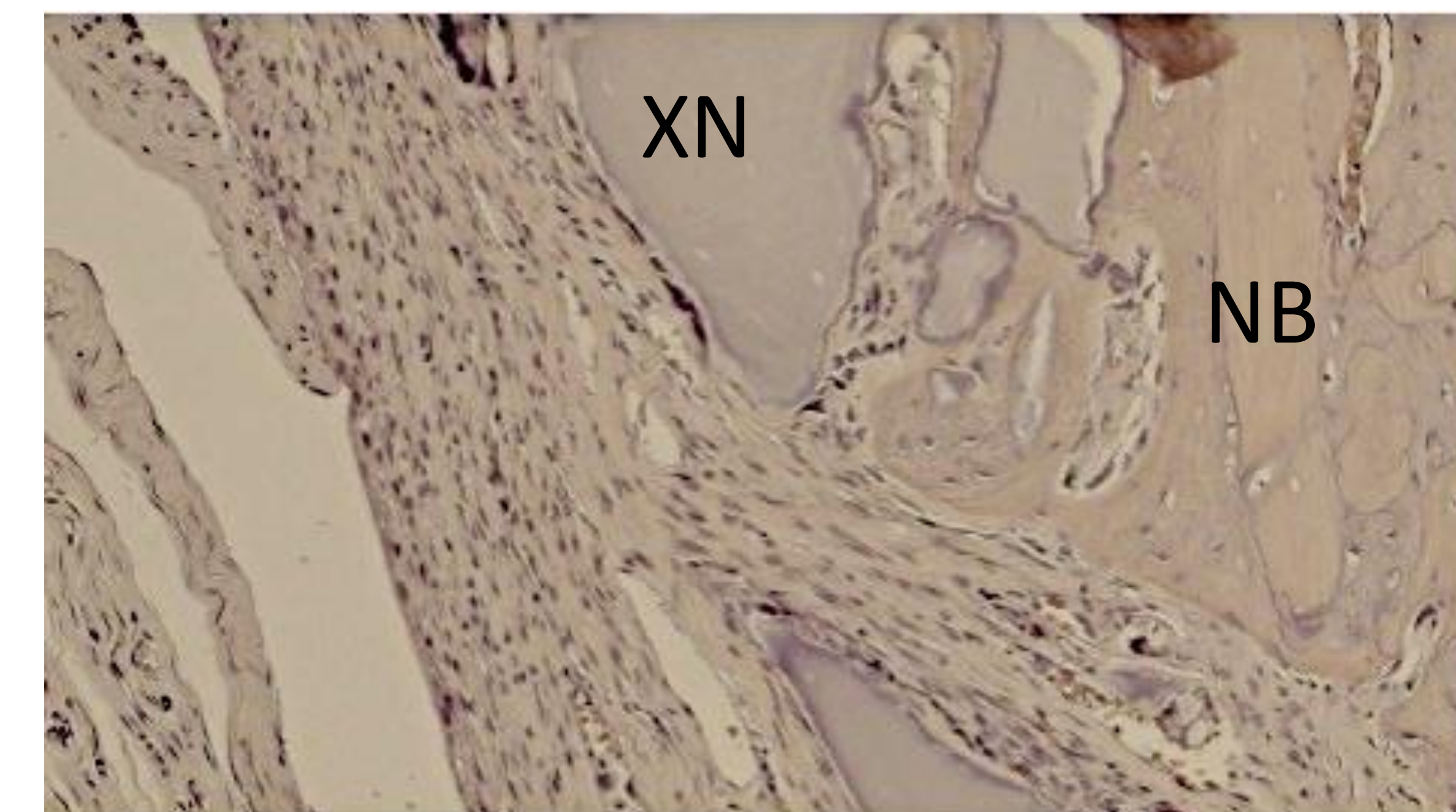
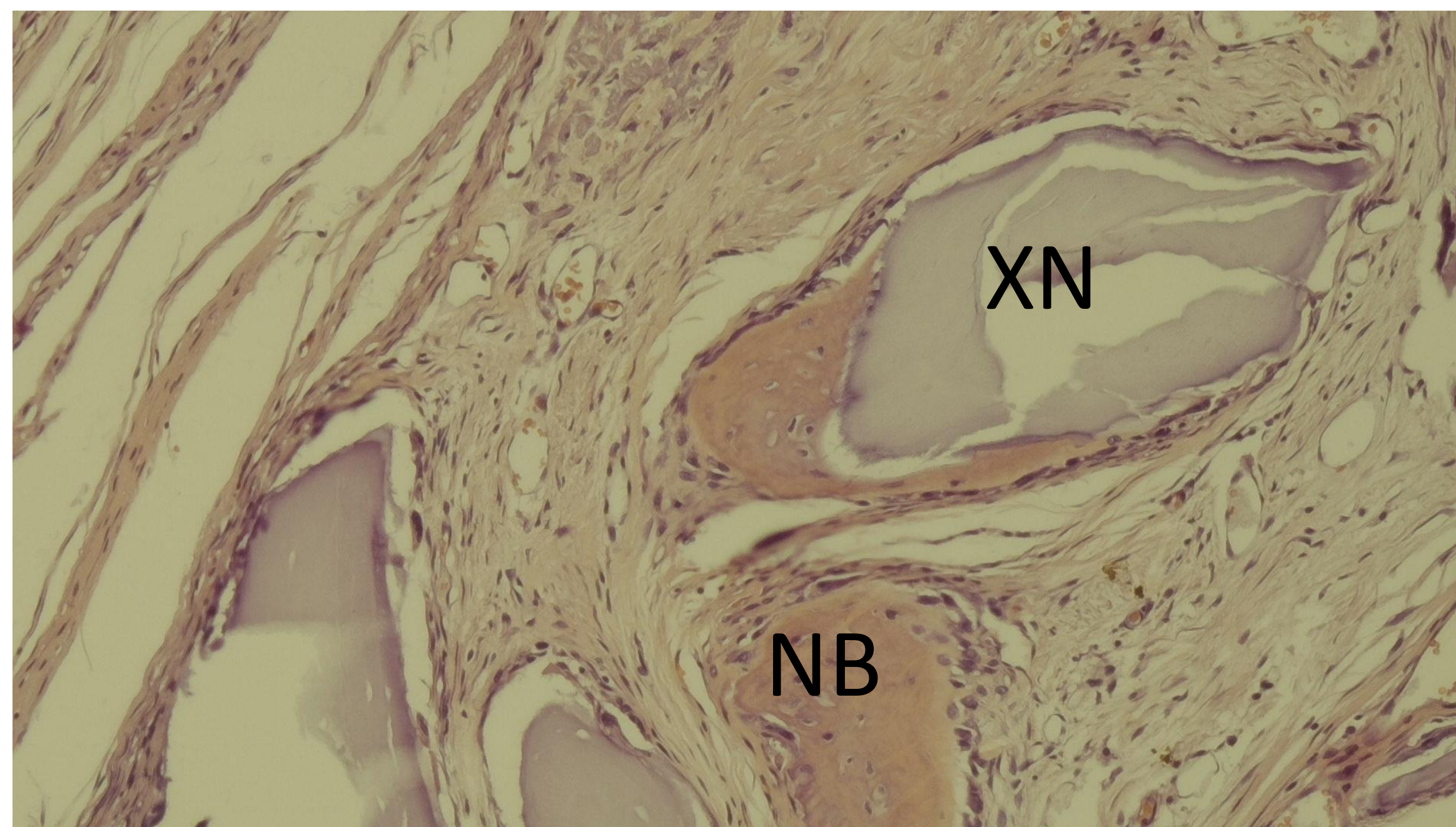
40x

100x



100x

200x



200x

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Bio-Gide (CG)

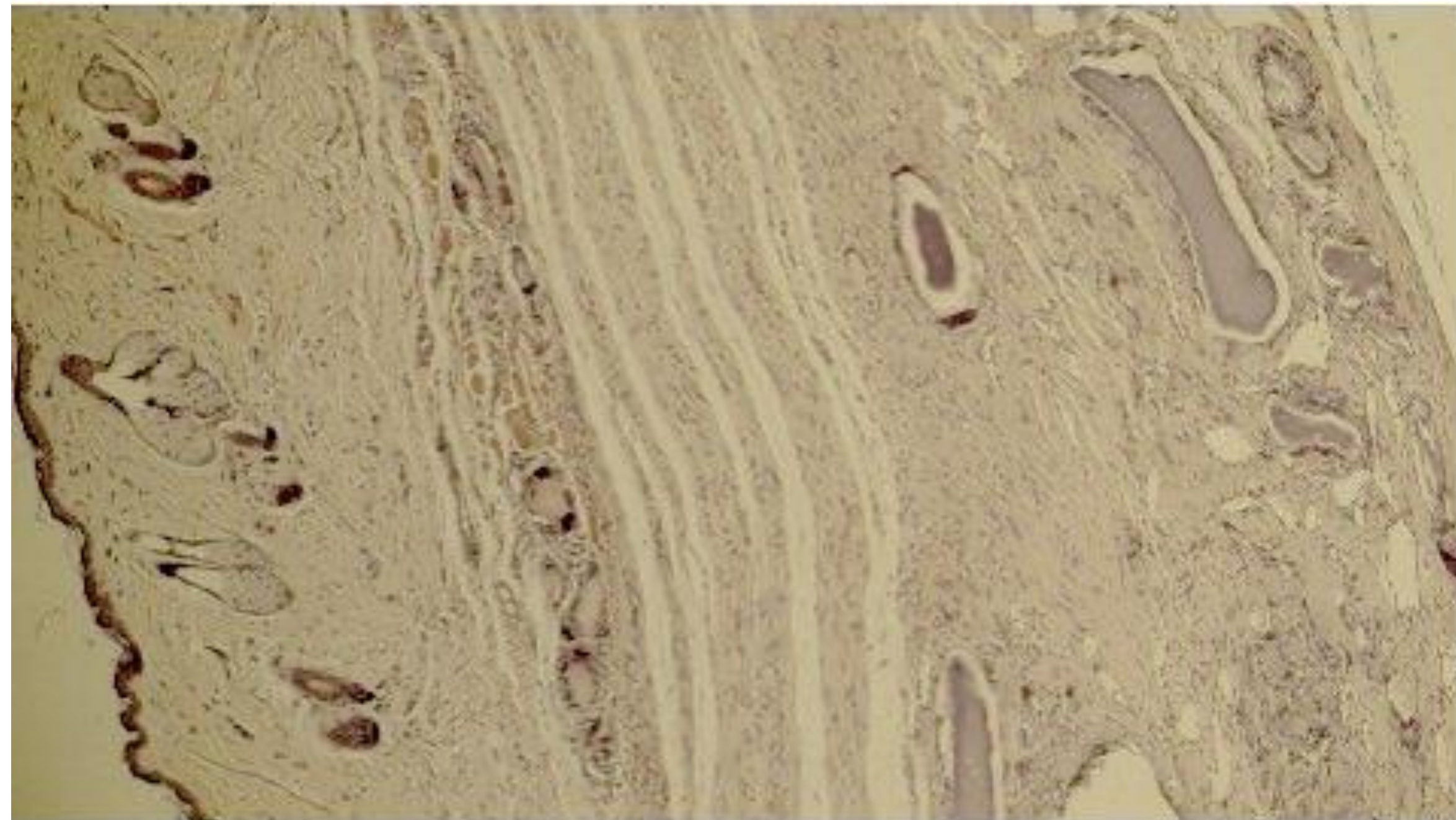
Test Membrane (TG)

40 days

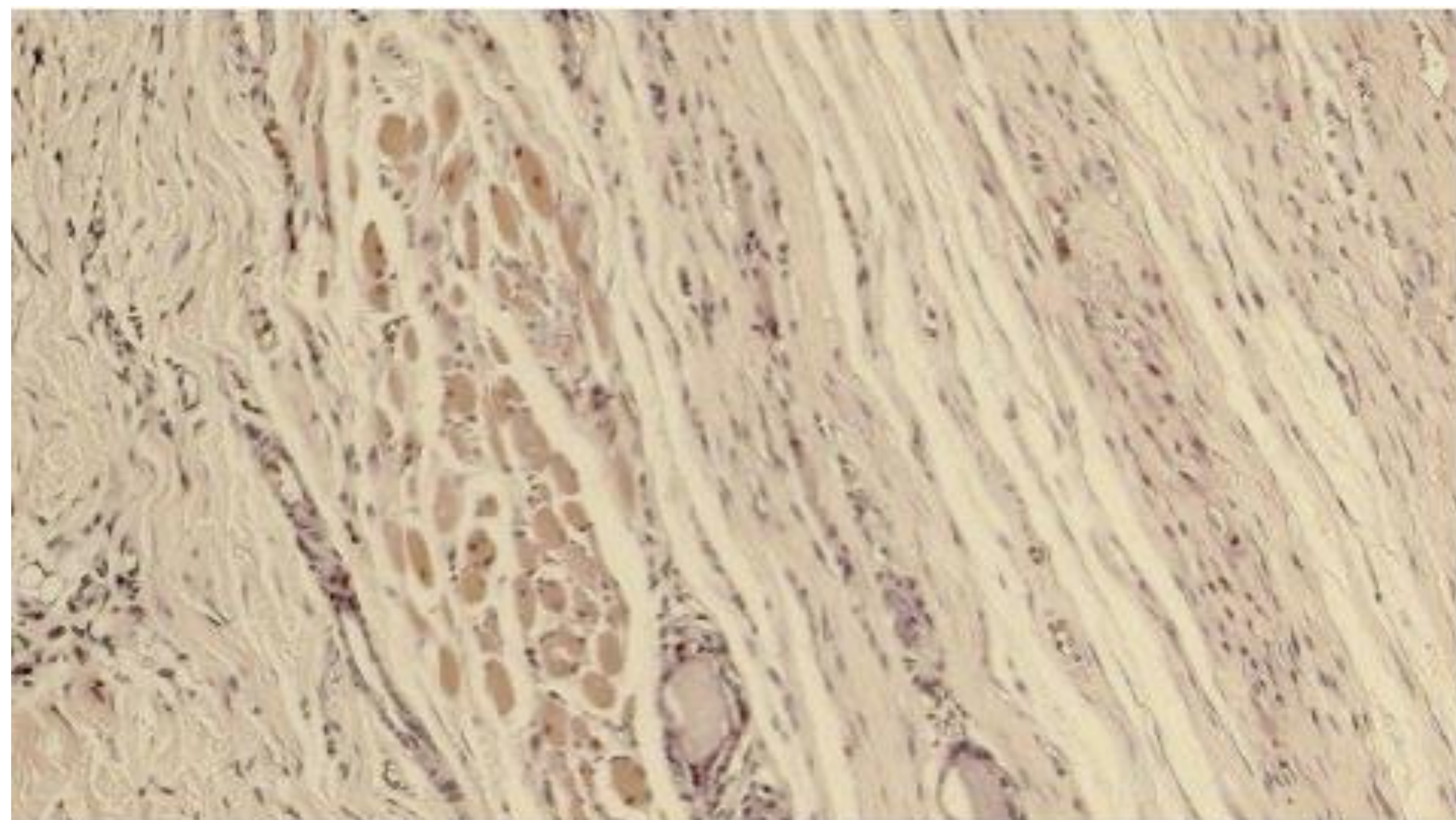
Membranes Almost
Completely Reabsorbed

XN = xenograft

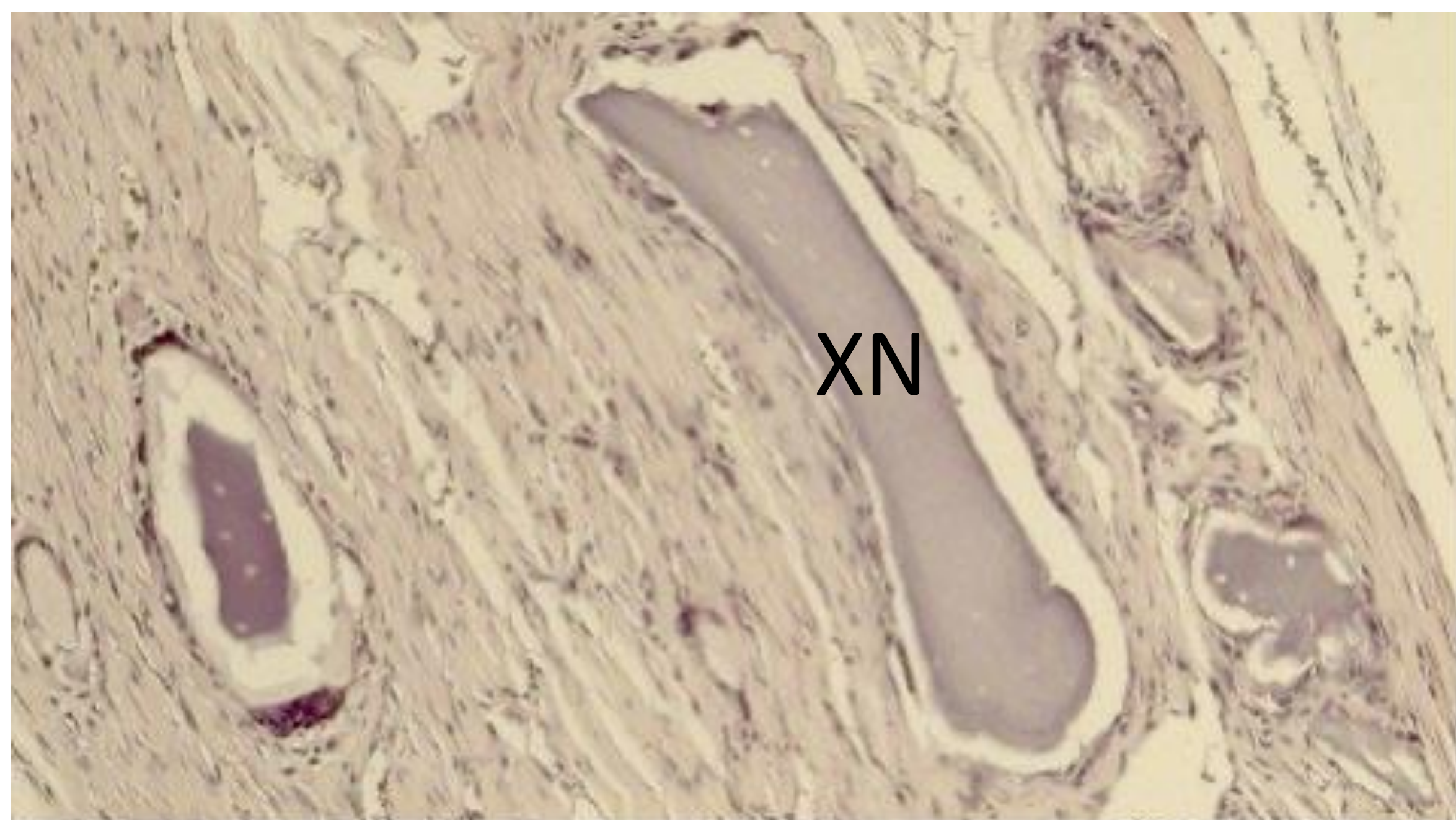
40x



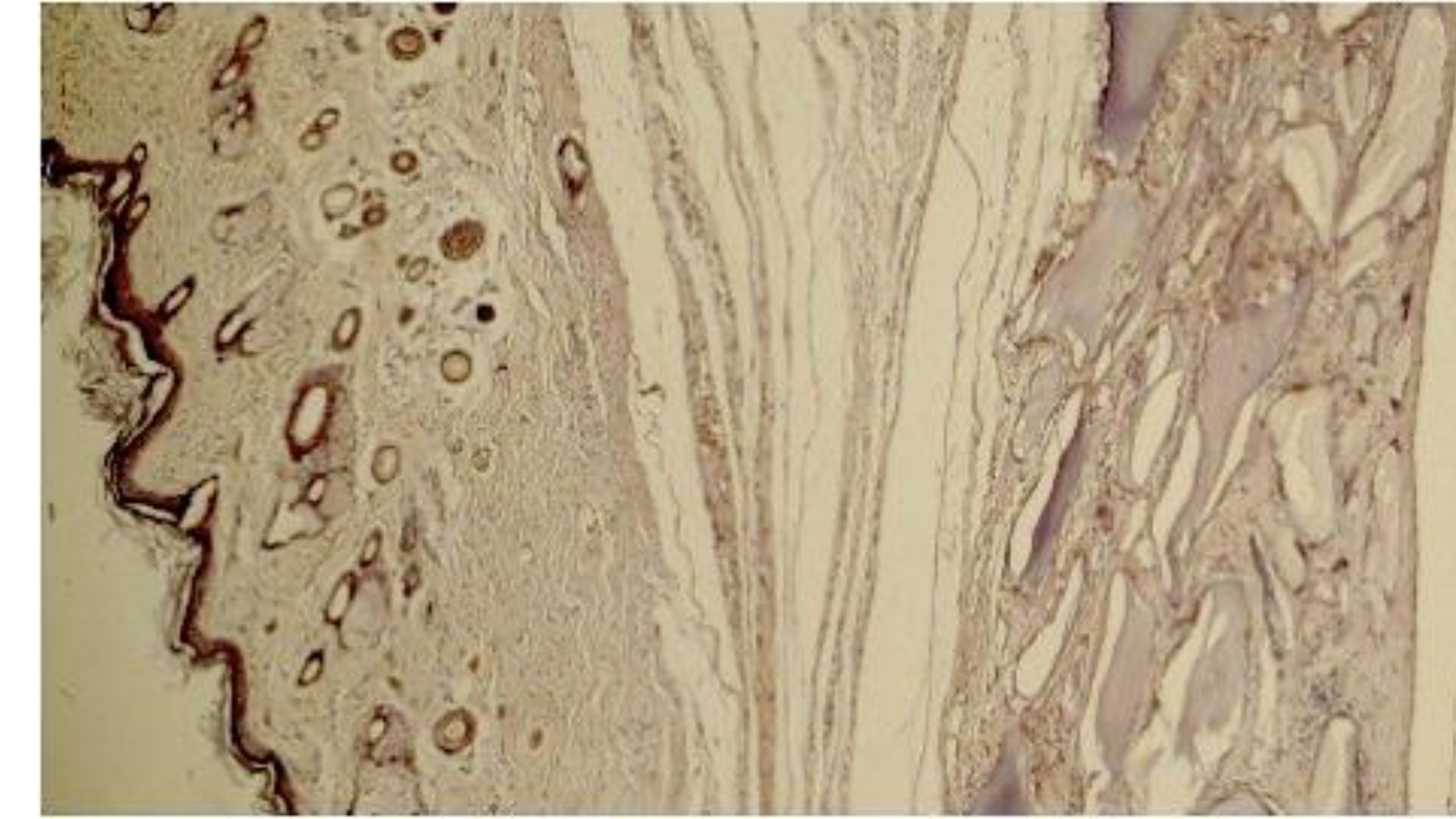
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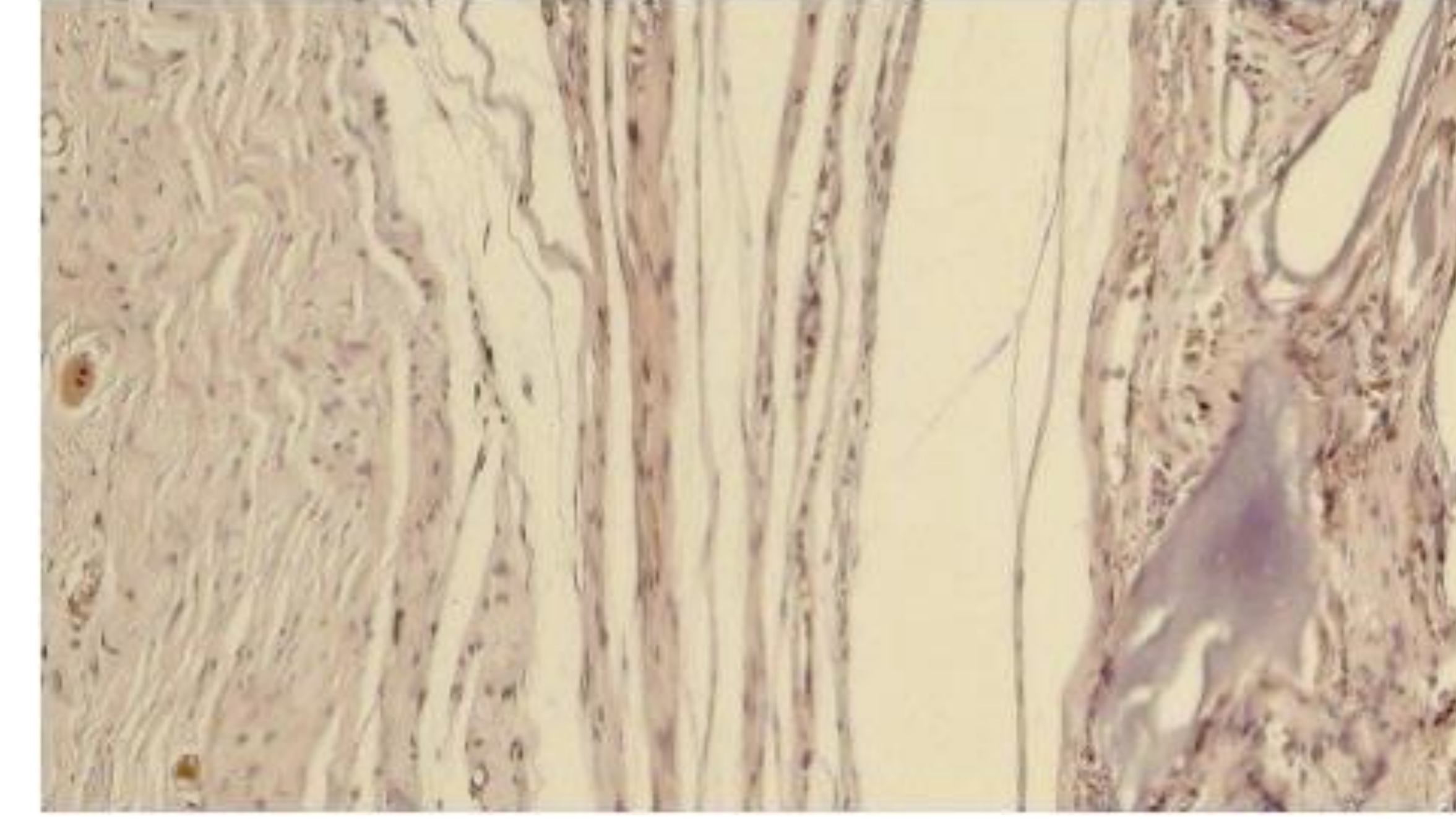
200x



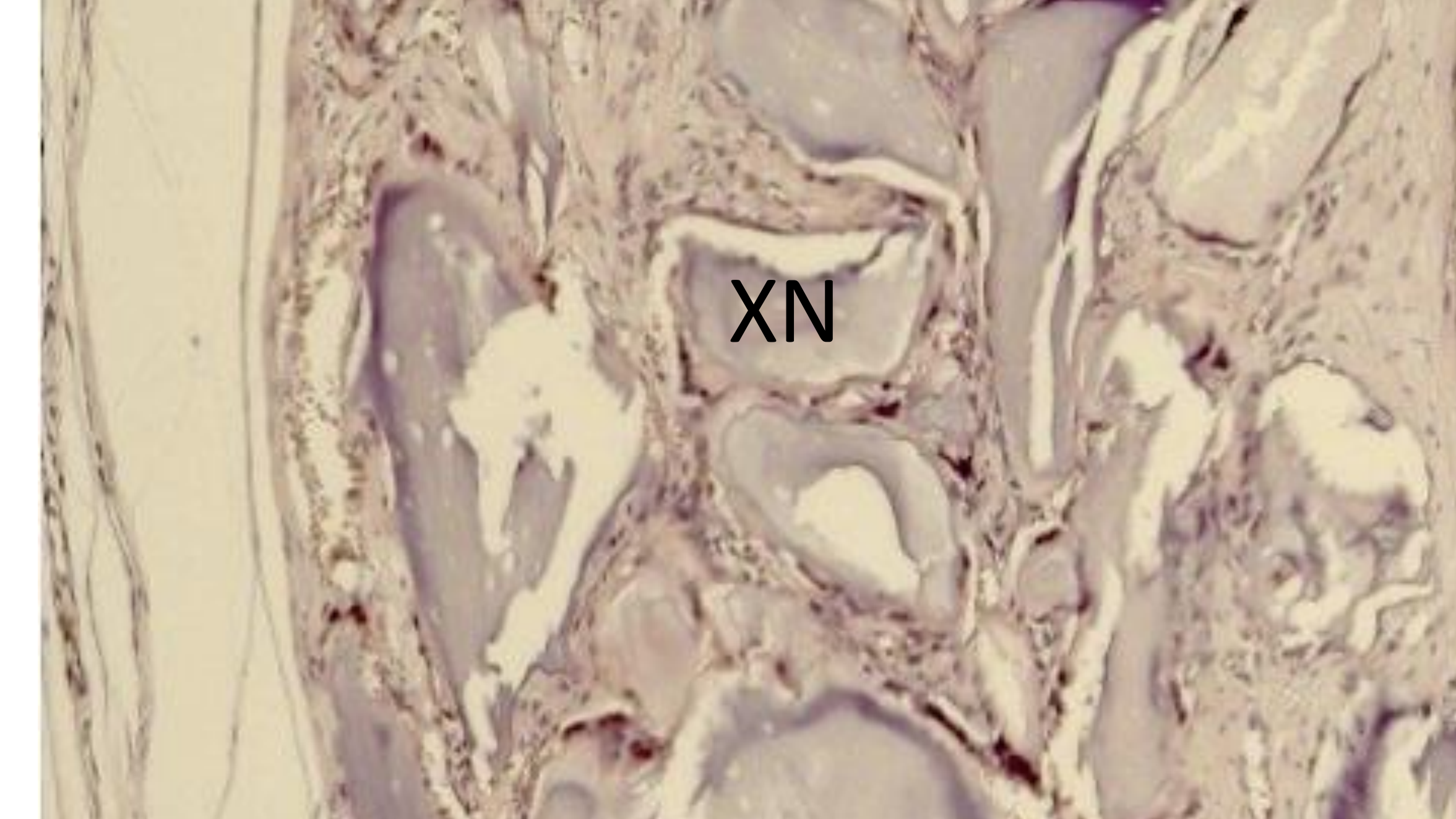
40x



100x



200x



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The use of bone grafts in association with collagen membranes is widely proposed as an effective approach for guided bone regeneration. One of the main advantages of resorbable membranes is the elimination of the need for a secondary surgical procedure for their removal.

In addition, collagen membranes play a critical role as a biological barrier, preventing the invasion of soft tissue cells into the grafted area and thereby allowing undisturbed bone regeneration. Such membranes should exhibit adequate structural integrity to support bone formation and maturation, demonstrate appropriate biocompatibility, prevent infection, and undergo controlled resorption.

Both collagen membranes demonstrated excellent performance, supporting new bone formation, presenting minimal inflammatory response, and exhibiting nearly complete resorption after 40 days in this experimental model.