

IN SITU TISSUE ENGINEERING WITH INTEGRA & PRIMATRIX HISTOGENESIS AND WOUND CLOSURE USING REGENERATION TEMPLATES

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WOUND CLOSURE BY TISSUE GENERATION IN BIOMATRICES • A Process Independent of Physiological Wound Repair



Beauty and adaptation on the bajada. —◆◆— **Springtime in the Sonoran Desert** —◆◆— *Something splendid from a harsh landscape.*

**IN SITU
TISSUE ENGINEERING
- WITH -
REGENERATIVE
MATRICES**

**FOUR CONCEPTUAL
MODES OF USE**

- CRITICAL COVERAGE**
 - BIOLOGICAL SUPERDRESSING**
 - ESSENTIAL COVERAGE**
 - RECONSTRUCTION**
-



**CRITICAL
COVERAGE**

Integra masks wound recognition and suppresses inflammation. Used during clinical illness or wound instability, Integra arrests adverse pathology & induces recovery.



**BIOLOGICAL
SUPERDRESSING**

Unlike ordinary biological dressings which have only a temporary role to induce wound stability, Integra survives that phase then has a 2nd function to regenerate a neodermis.

IN SITU TISSUE ENGINEERING - WITH - REGENERATIVE MATRICES

FOUR CONCEPTUAL MODES OF USE



CRITICAL COVERAGE
BIOLOGICAL SUPERDRESSING
ESSENTIAL COVERAGE
RECONSTRUCTION

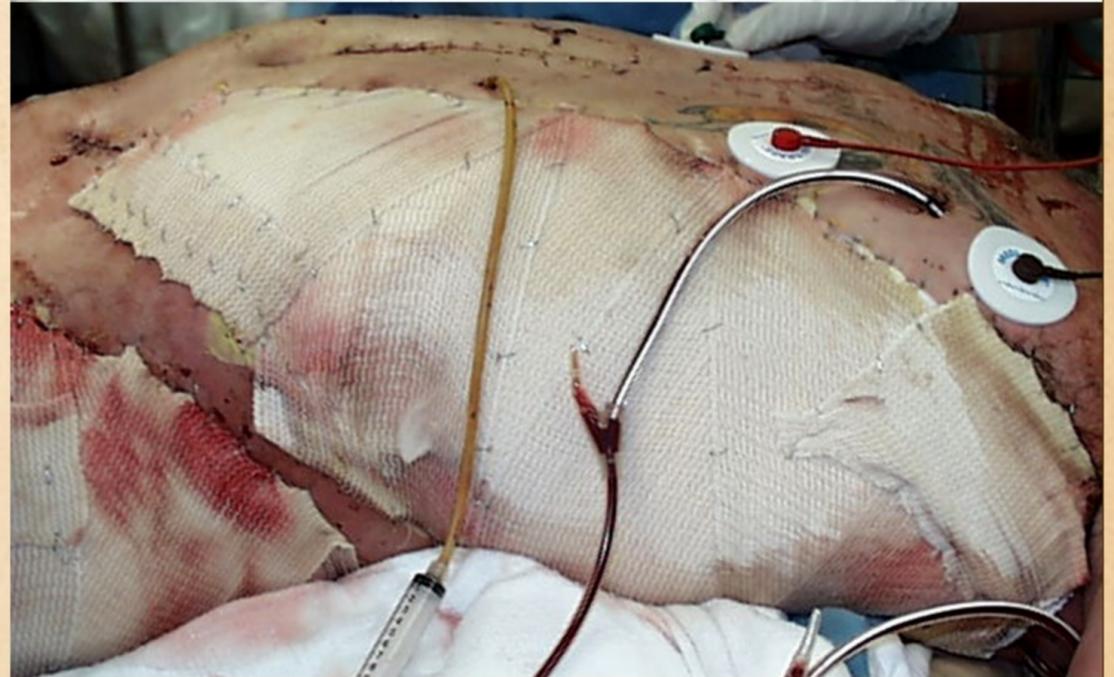
ESSENTIAL COVERAGE

Refers to exposed anatomy in a wound that places life or limb at risk, or else cannot heal by natural contraction. Integra resolves both, acting as skin, then restoring it over such structures.

RECONSTRUCTION

Integra prevents inflammation and normal wound healing, and thus scar. For reconstructive surgery, it prevents and relieves contractures and preserves good qualities of skin.

REGENERATIVE MATRICES: CRITICAL COVERAGE • BSD • ESSENTIAL COVERAGE • RECONSTRUCTION



REGENERATIVE MATRICES: CRITICAL COVERAGE • BSD • ESSENTIAL COVERAGE • RECONSTRUCTION

BIOLOGICAL SUPERDRESSING



REGENERATIVE MATRICES: CRITICAL COVERAGE • BSD • ESSENTIAL COVERAGE • RECONSTRUCTION



REGENERATIVE MATRICES: CRITICAL COVERAGE • BSD • ESSENTIAL COVERAGE • RECONSTRUCTION



What would you do?

There are certain wounds that require surgery to cure but which conventional surgery cannot solve.

There are times when flaps, grafts, and other usual repairs will fail due to caveats of disease, anatomy, comorbidity, & other risks.

THEN WHAT ?

In the following cases, how would treatment differ for hypothetical versus true histories?





Caveats

55 f

fall

impact injury

lacerations, hematoma

Active immunopathy puts wounds and autogenous repair at risk.

Patient's severe pulmonary disease prevents any prolonged surgery and anesthesia.

65 f

*Wegener's
granulomatosis*



Caveats

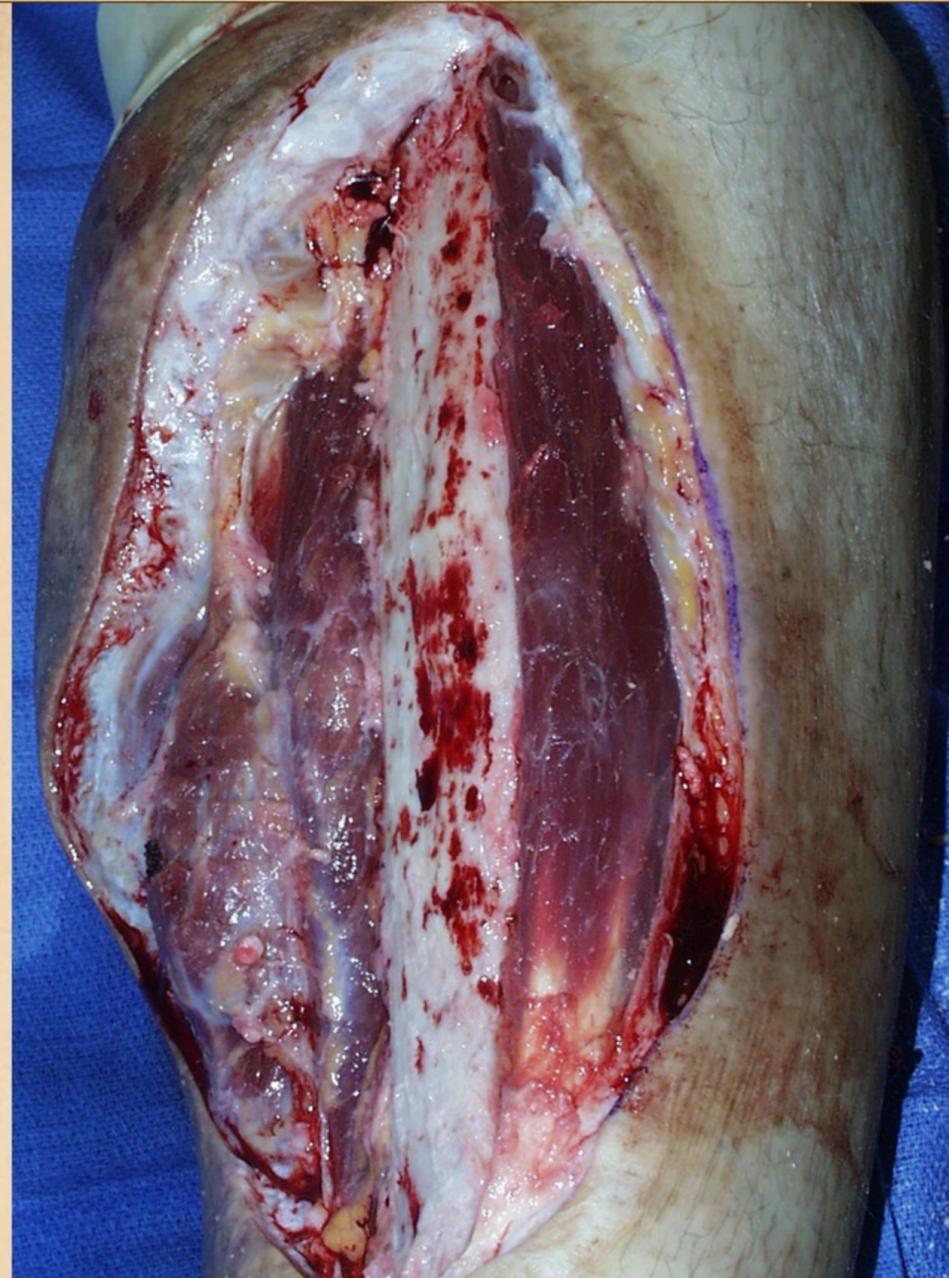
52 f
puncture wound
abscess

No local flaps.

Skin grafts ineligible over bone and joint.

Potential free flap, into the bypass graft,
but inadvisable due to cardiovascular risks.

67 f
ischemic
infarction



33 m

*machinery versus
pedestrian
avulsion –
degloving*

Caveats

Skin grafts have failed. Local flaps too small.
Latissimus f.f. disabling in a working man.
Omentum and rectus abdominis f.f. prone
to ventral herniation in an obese patient.
High risk of any flap thrombosis.

33 m

*venous
hypertension
Factor V Leiden*



39 m

knee fibrosarcoma

thin flaps

radiation

64 m

aorto-iliac

occlusive disease

Caveats

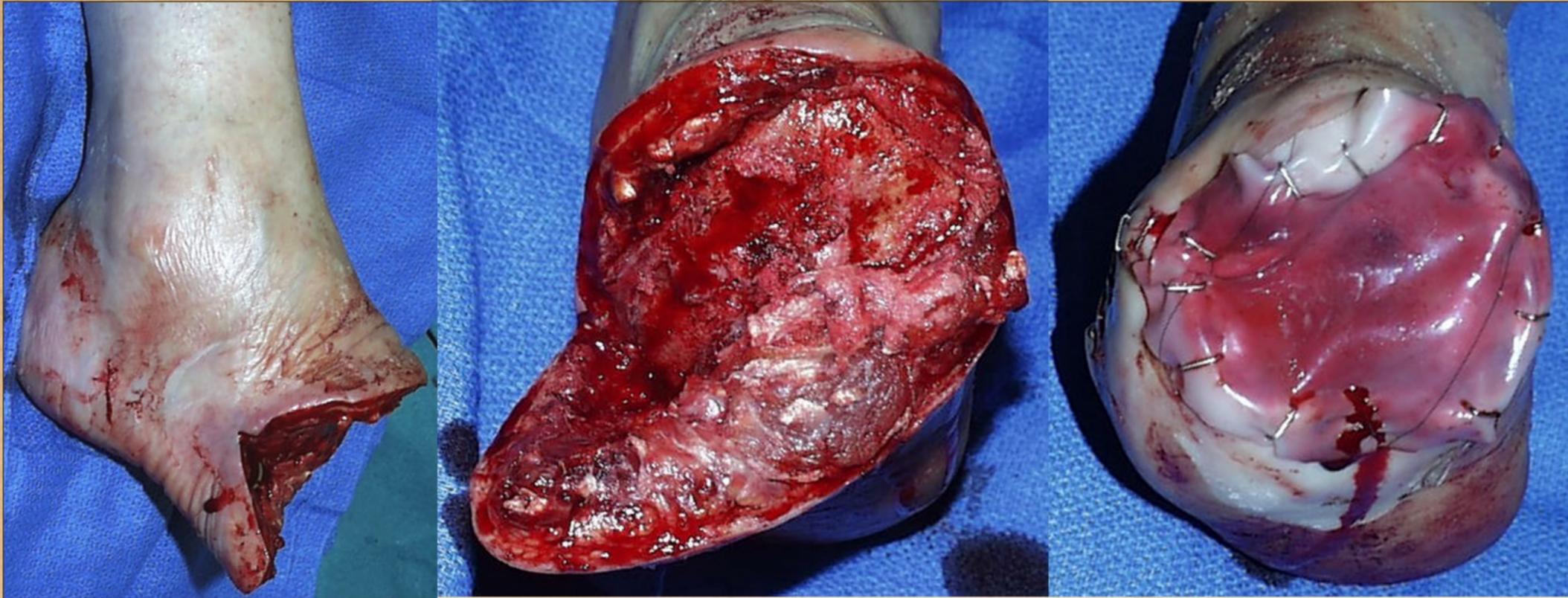
Any incision on this thigh is prone to pathergy and necrosis.

Local flaps and repair will die.

Abdominal flaps (e.g. rectus abdominis) will fail from ischemia

Latissimus free flap contraindicated in a wheelchair bound patient . . .

but moot because there is no connection for a free flap.



*28 m
traumatic
crush
of
forefoot*



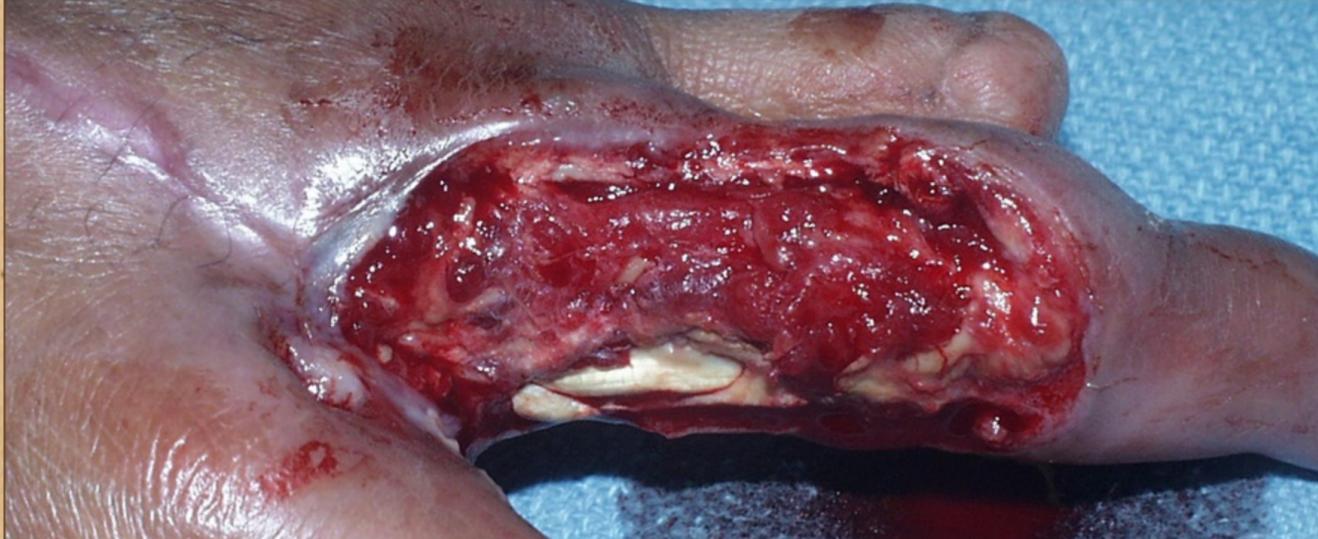
*73 m
embolic necrosis*

Caveats

No local flaps.

Skin grafts ineligible
over bone and joint.

Free flaps precluded by vascular
disease and cardiovascular risks.



Caveats

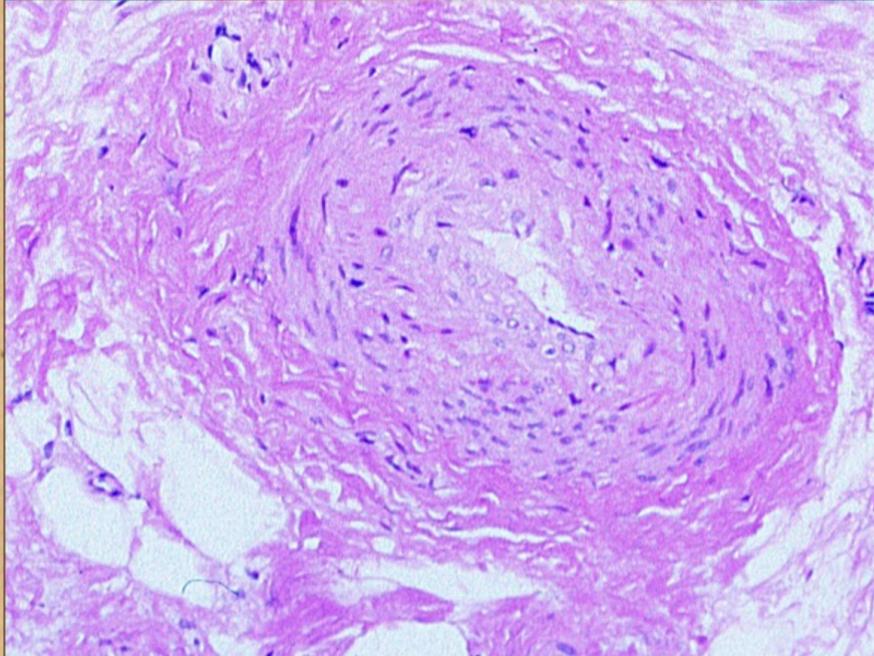
42 f
human bite
tenosynovitis

Local flaps are not big enough.
Flap failure likely due to vascular disease.
No recipient vessels for a free flap.
Any incision prone to pathergy and necrosis
(*why the hand is this way to begin with*).
Patient cannot afford to lose more of the hand.

42 f
diabetes
atherosclerosis



*43 m
motorcycle injury
hand abrasion*



*43 m
scleroderma
vasculopathy*

Caveats

Any incision prone to pathergy and necrosis.

Flaps will not move properly due to sclerotic skin.

Hand is severely disabled, and cannot afford further loss.

Active immunopathy puts wounds and repair at risk.



INTEGRA VERSUS CONVENTIONAL SURGERY

Integra: Successful Surgery when other Options Fail

In each of these cases, conventional plastic surgery rules dictated a flap to close exposed essential structures, restore function, or salvage limbs.

In each, caveats of disease and local anatomy militated against flaps.

Each case was successfully closed or reconstructed with Integra, because Integra can circumvent most of these exceptions.

Understanding when a flap should be used, but cannot be used, is to understand when Integra should be used in lieu of conventional surgery.

 **REMEMBER** 

As for any wound closure, and especially with use of biologics and implants, proper preparation of the wound is mandatory, by a preliminary program to treat primary disease, control inflammation, debridement, & topical wound care.

Biological & Clinical Effects of Integra

Single device - dual role:

- 1 - high grade acute artificial skin.
- 2 - then becomes the skin regenerant.

Not alive, tolerates adverse conditions.

“Hides” wound from the host.

Eliminates inflammation.

Controls pathological behavior.

Embryonic dermatogenesis >> dermal equivalent.

No scar.

No contraction.

Tangential hystoconduction.

Effects on acute wounds:

Immediate wound closure.

Controls local and systemic effects of inflammation.

Minimizes pathergy and secondary tissue injury.

Effects on chronic wounds:

Survives and tames harsh wound conditions.

Eliminates “the wound” and inflammation.

Stabilizes pathological wounds, allows regeneration.



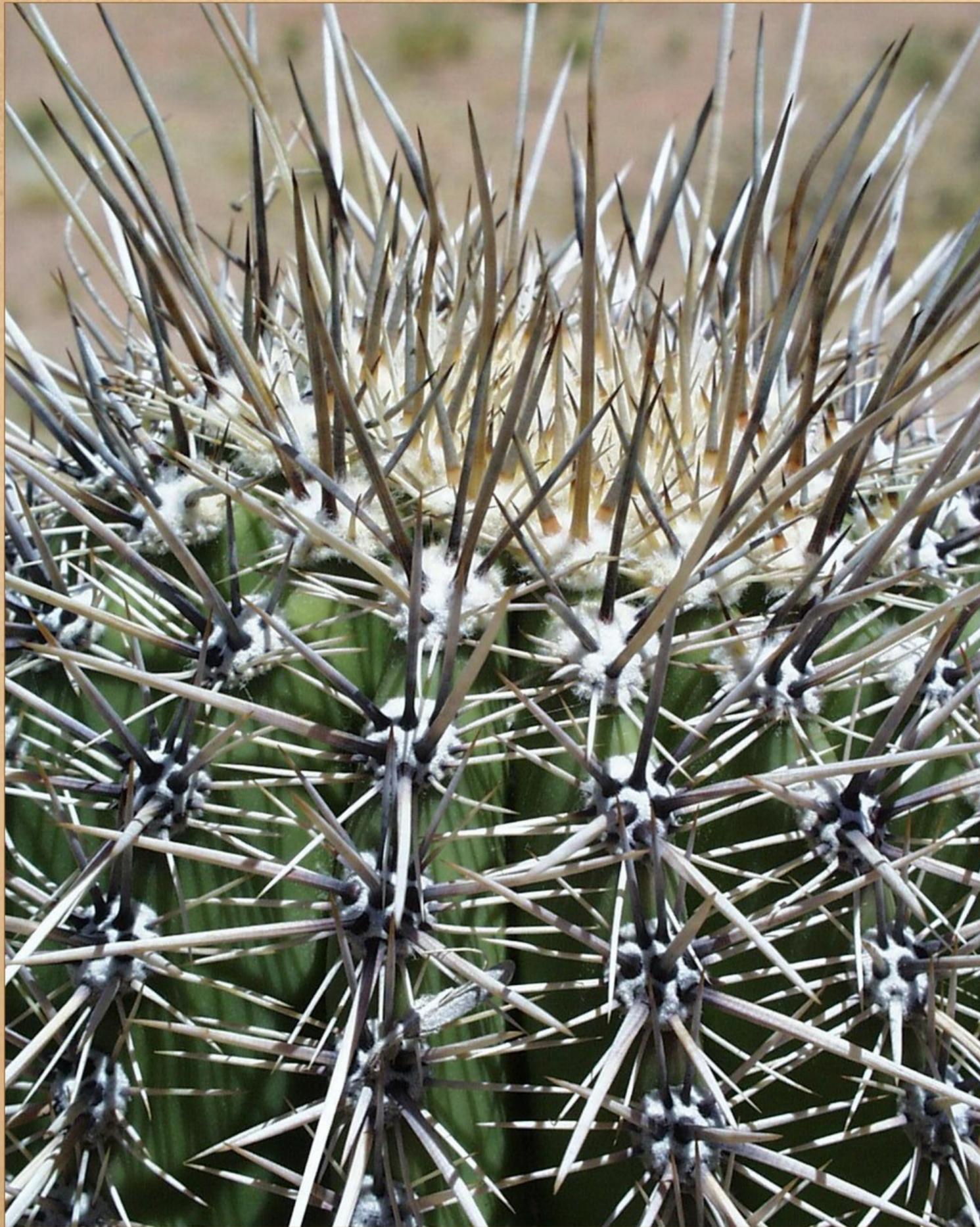
Suppress inflammation.



Control pathological behavior.



Tangential hystoconduction.

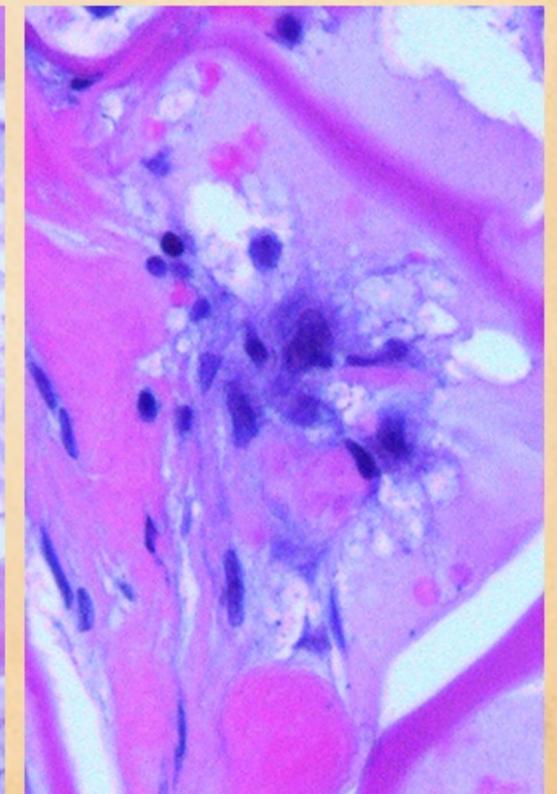
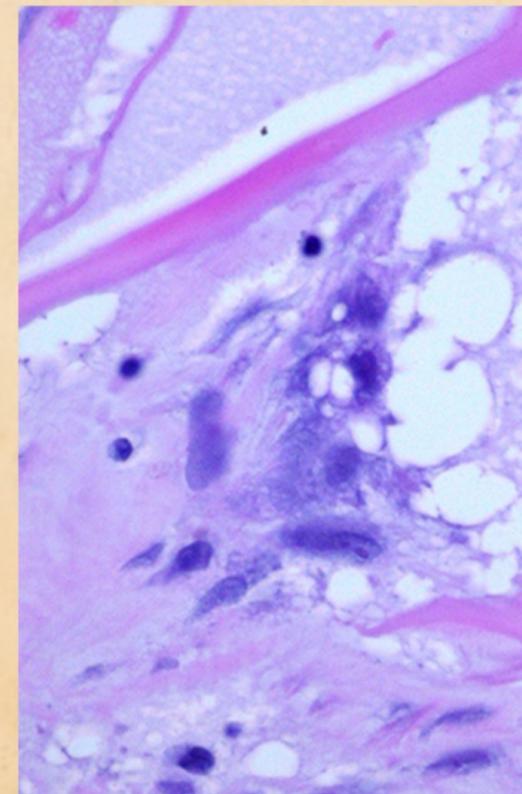


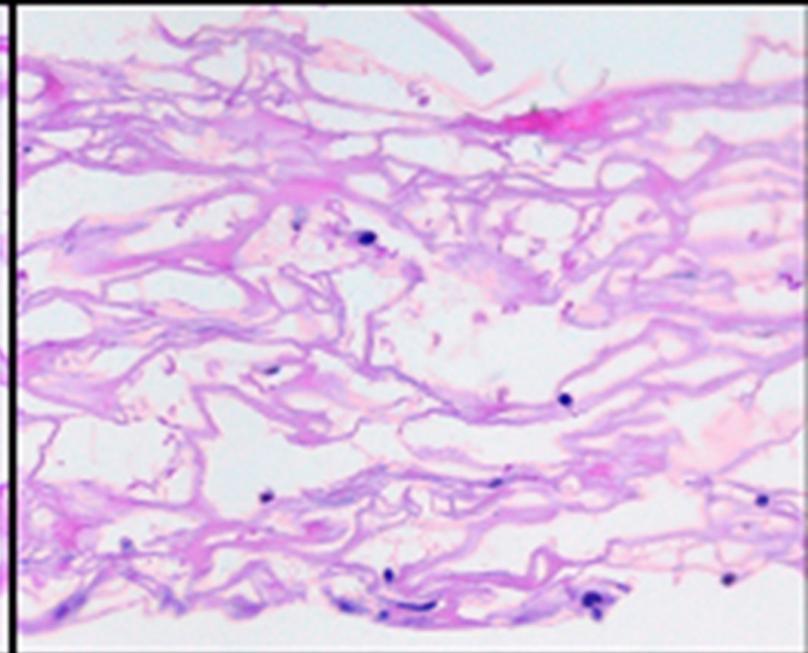
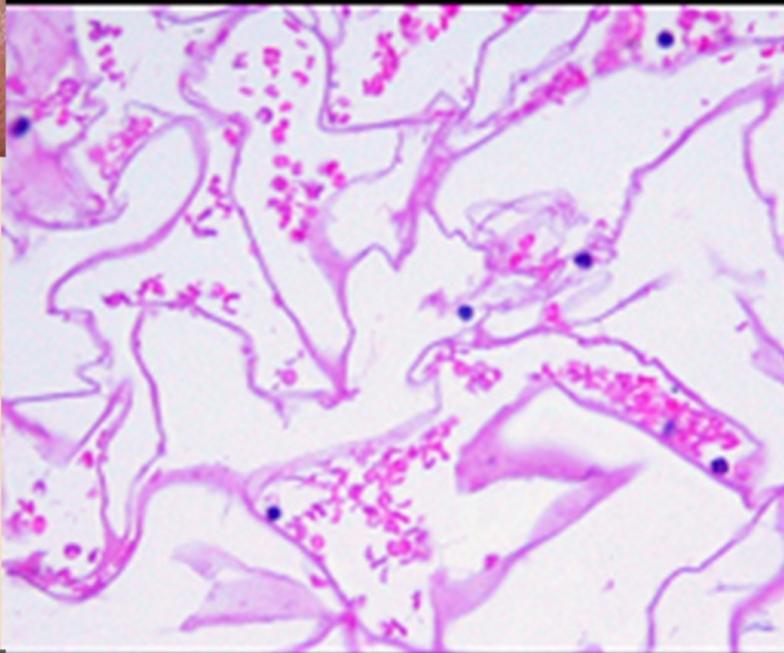
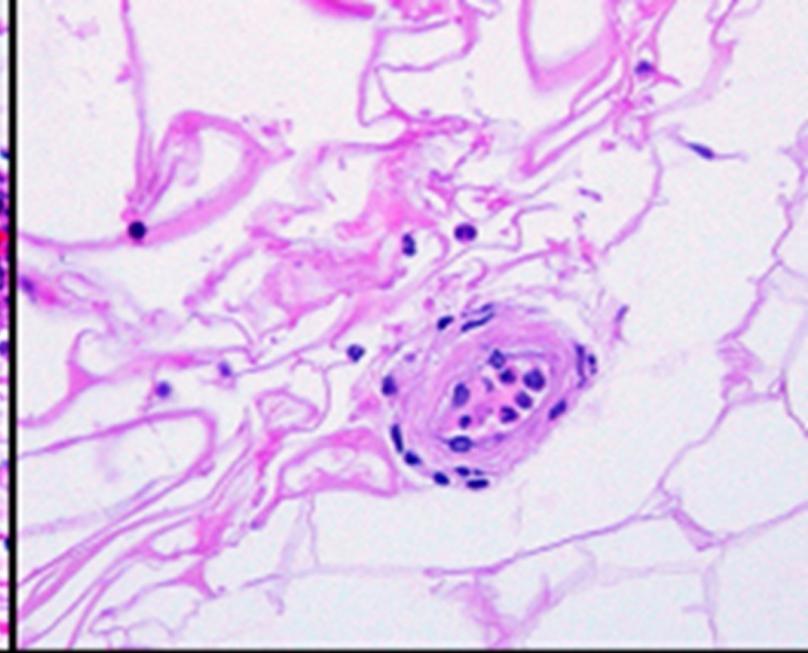
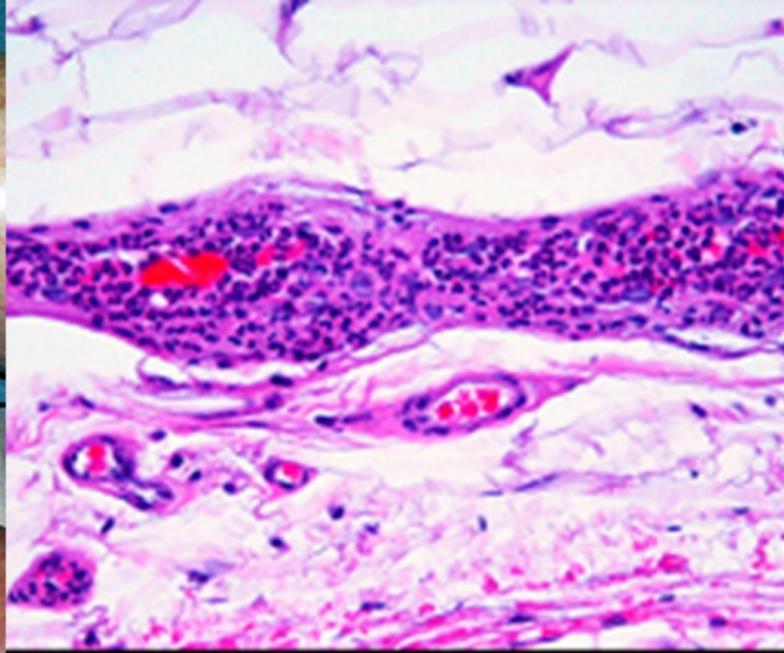
INTEGRA

BIOLOGICAL BASIS OF ITS REGENERATIVE & CLINICAL PROPERTIES

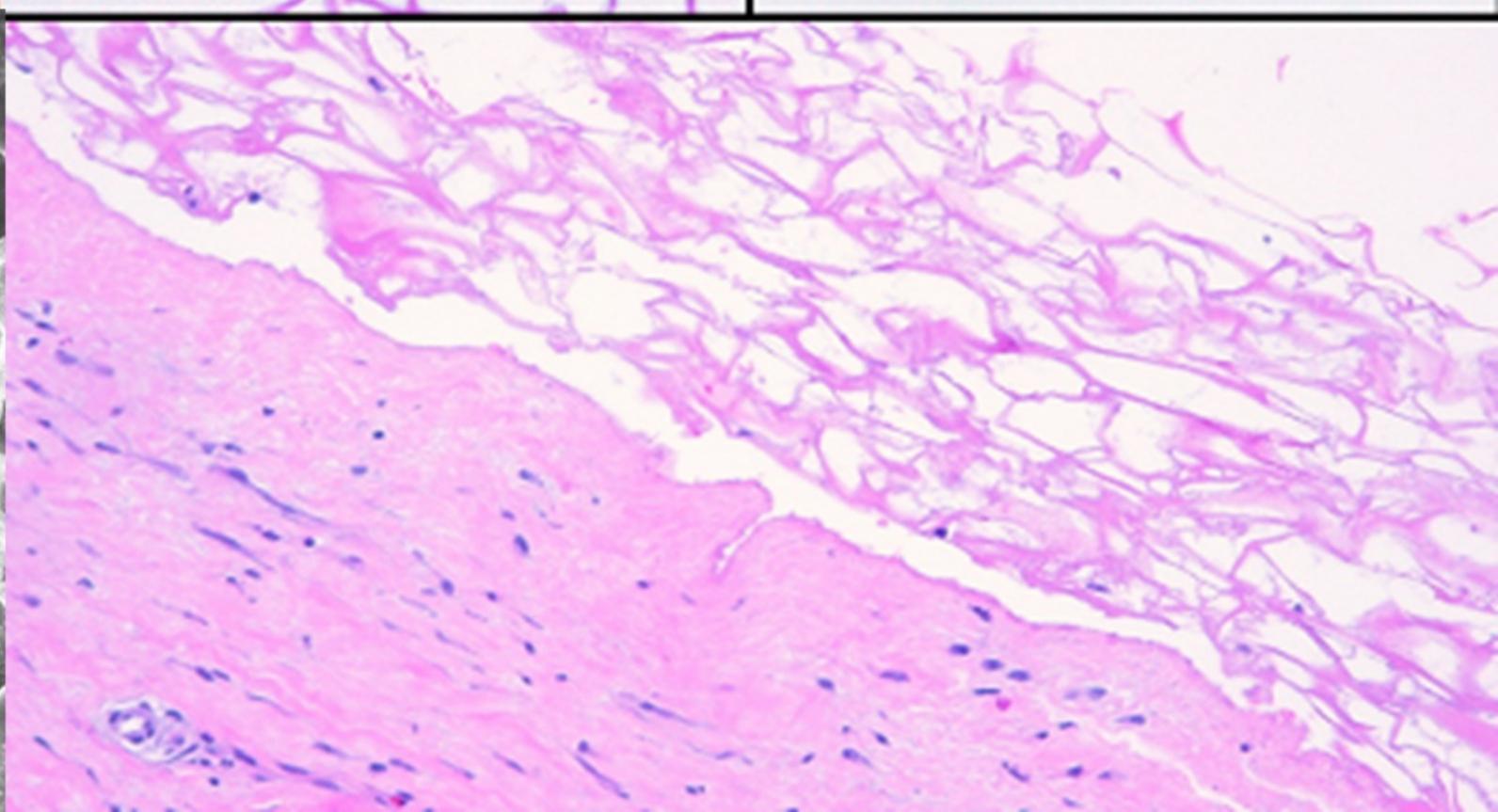
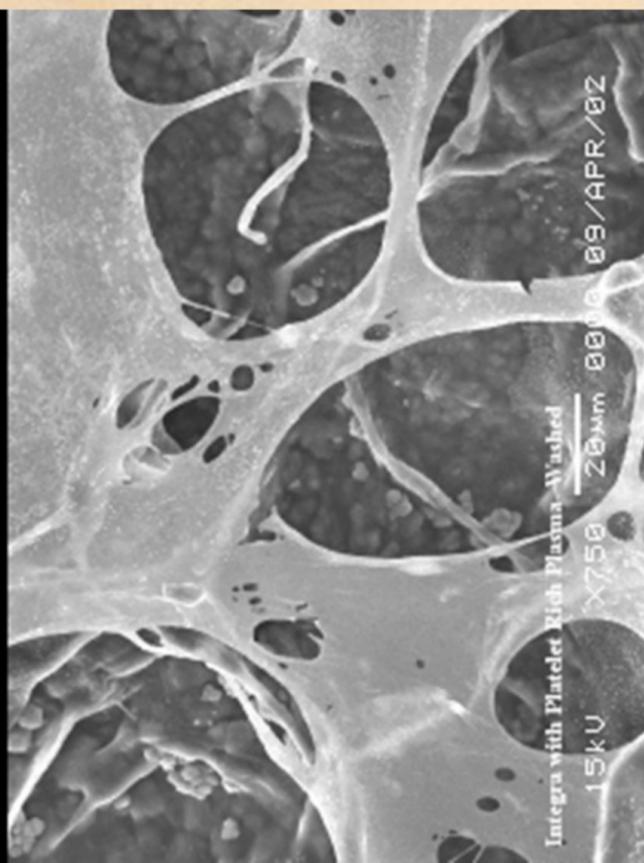
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**The syncytial fibroblast
and
embryonic histogenesis**

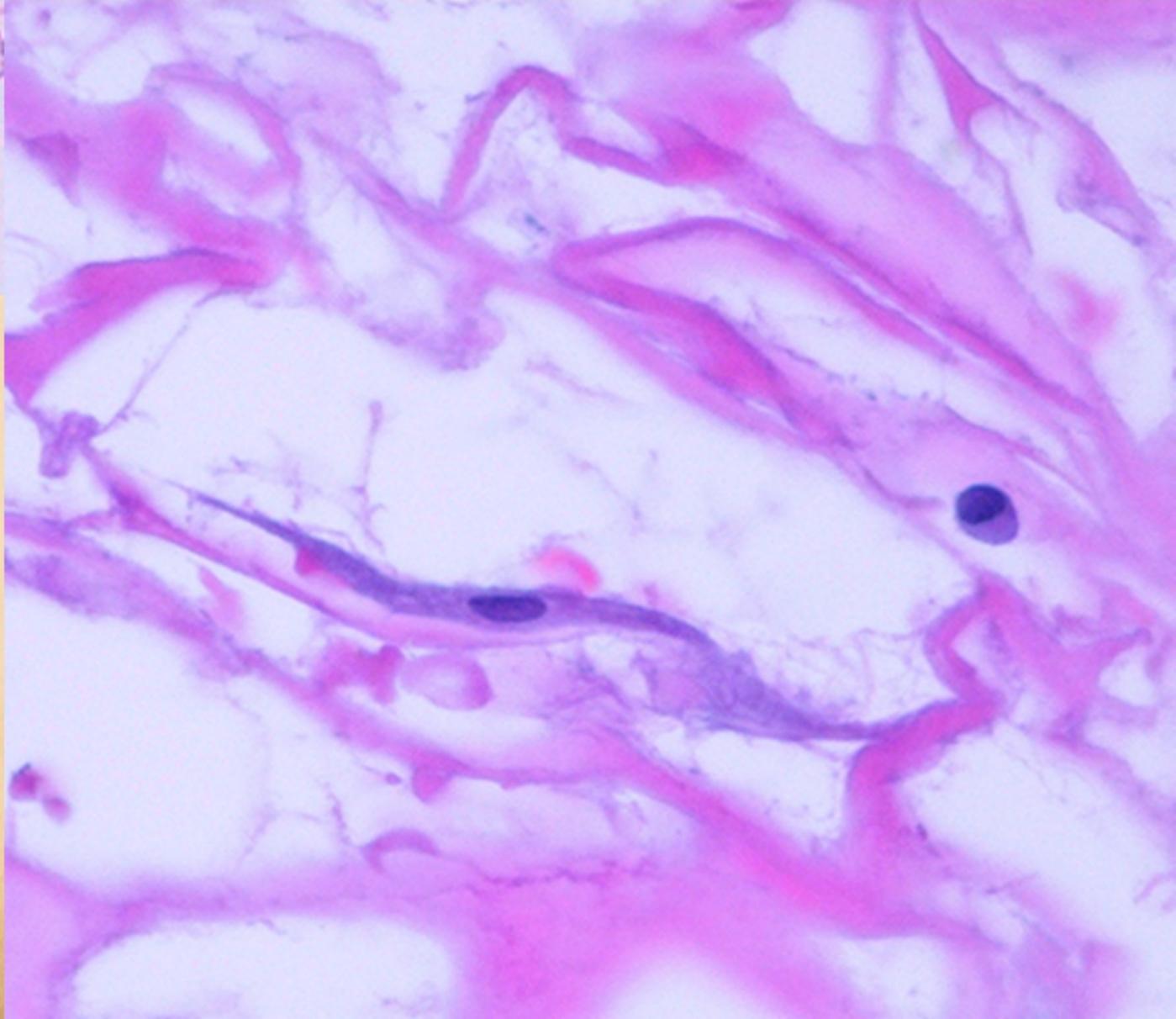
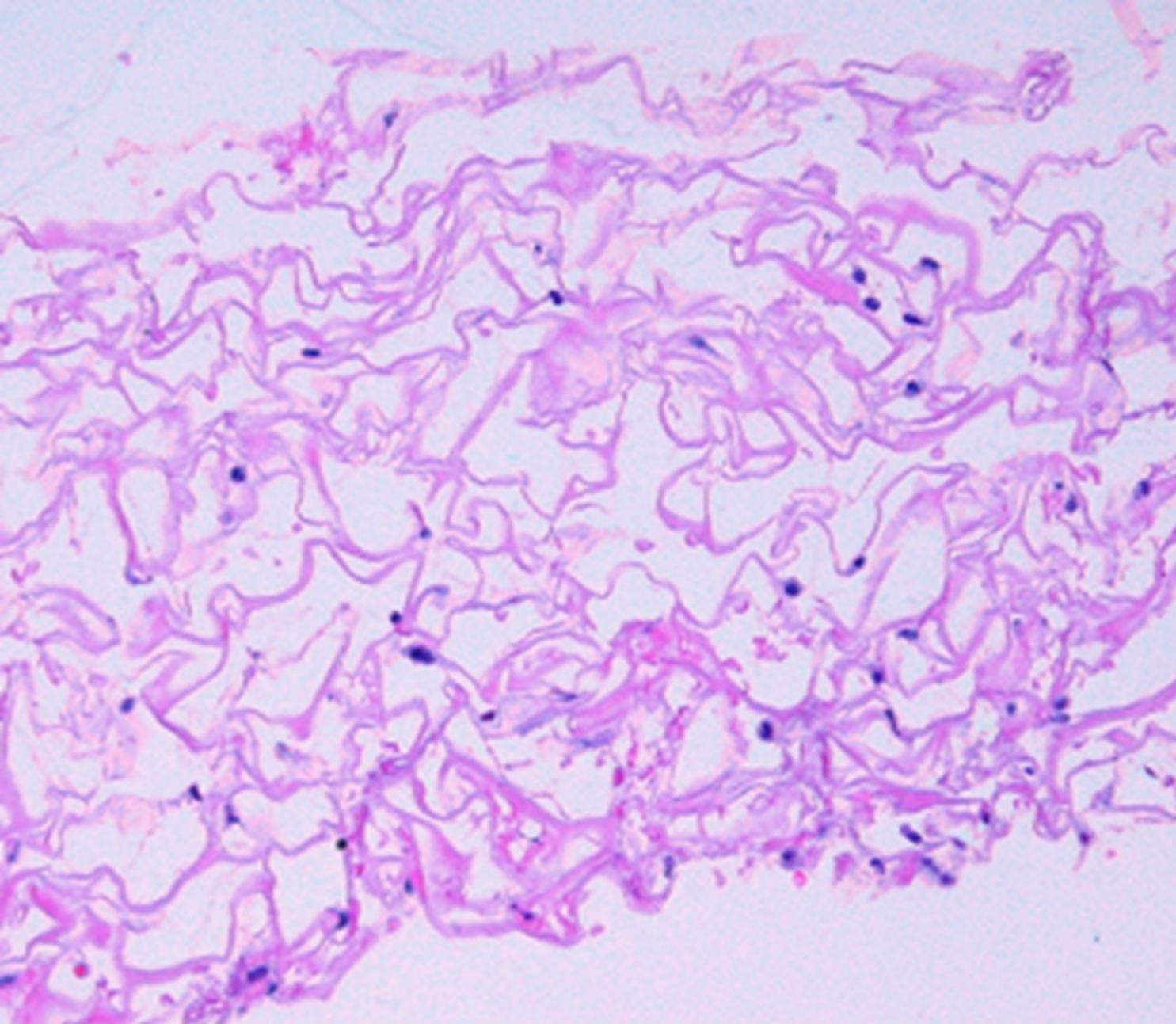




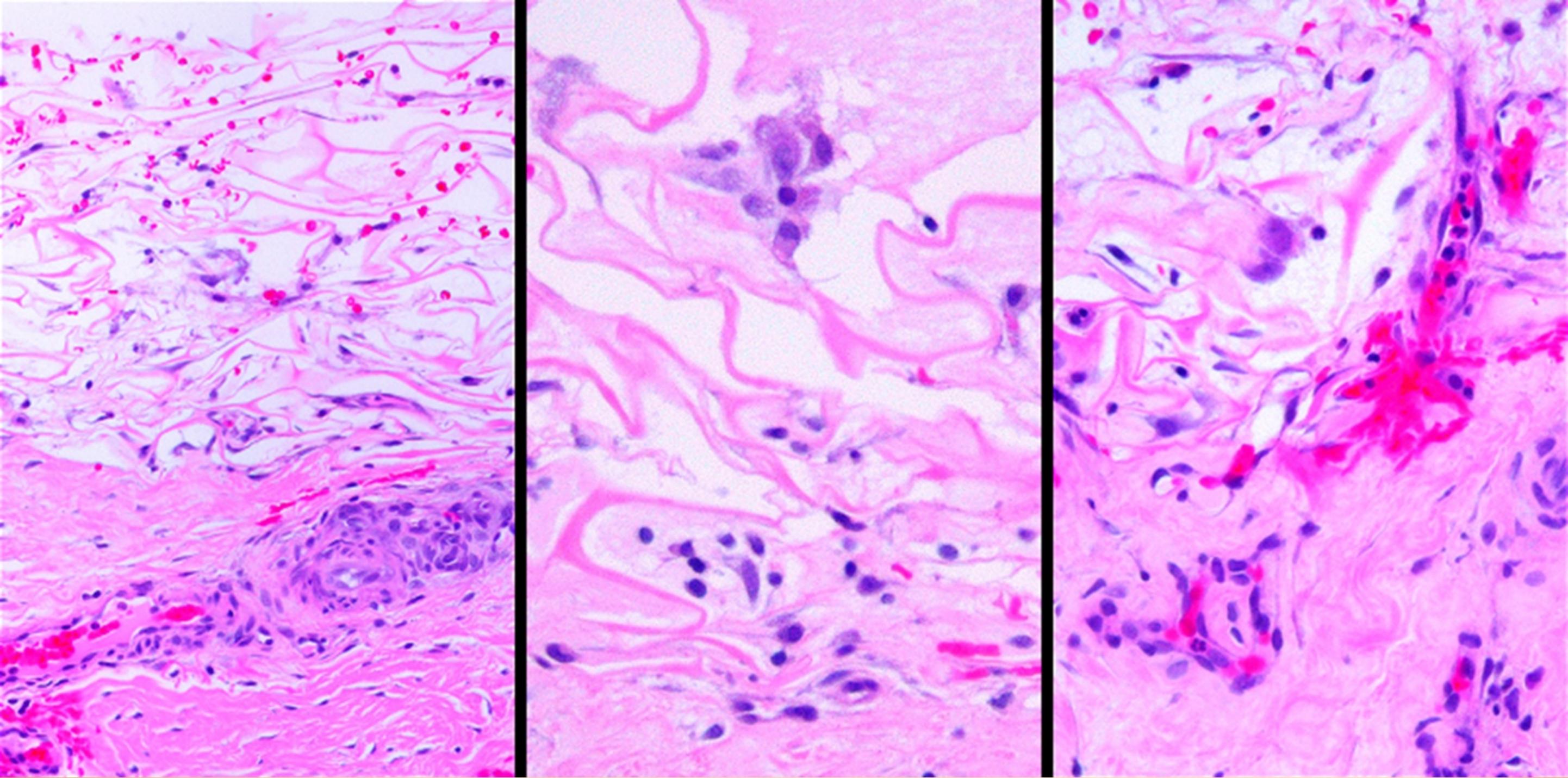
Arrest of inflammation



**Recognition of the matrix,
pioneer cells**



Transition



Syncytial transformation

Biological Effects of Integra

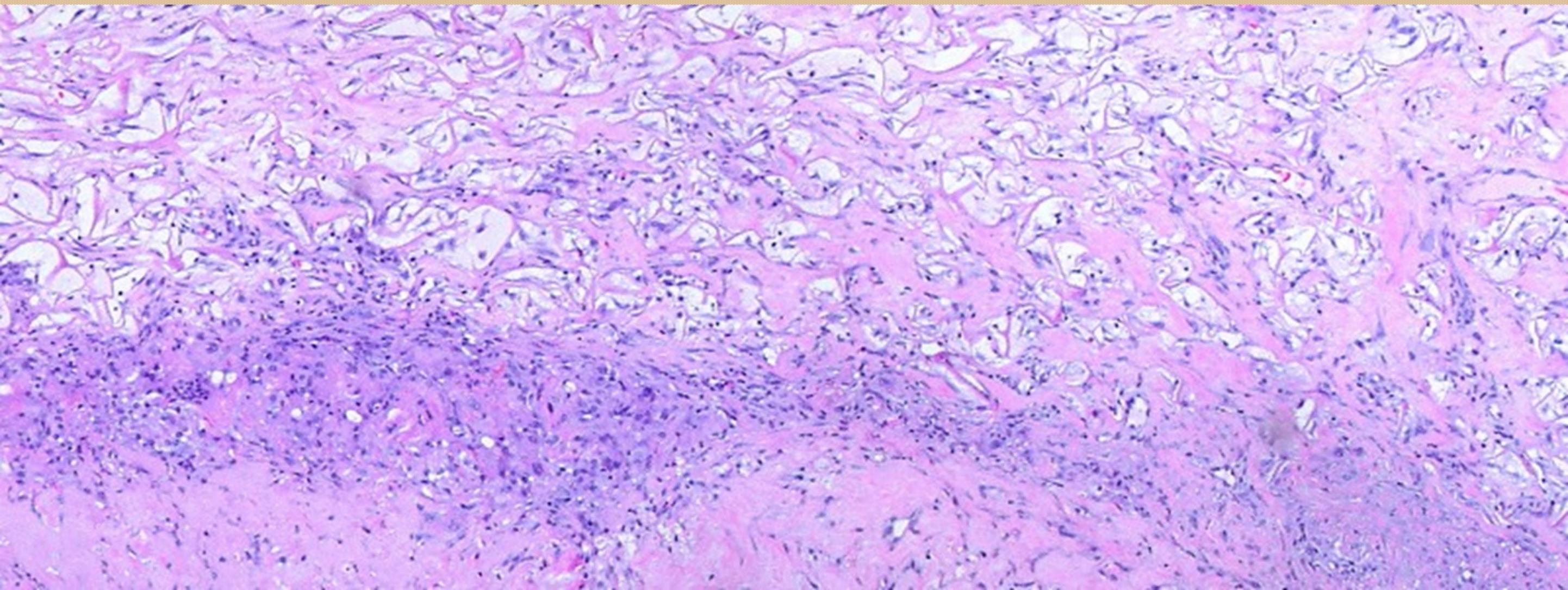
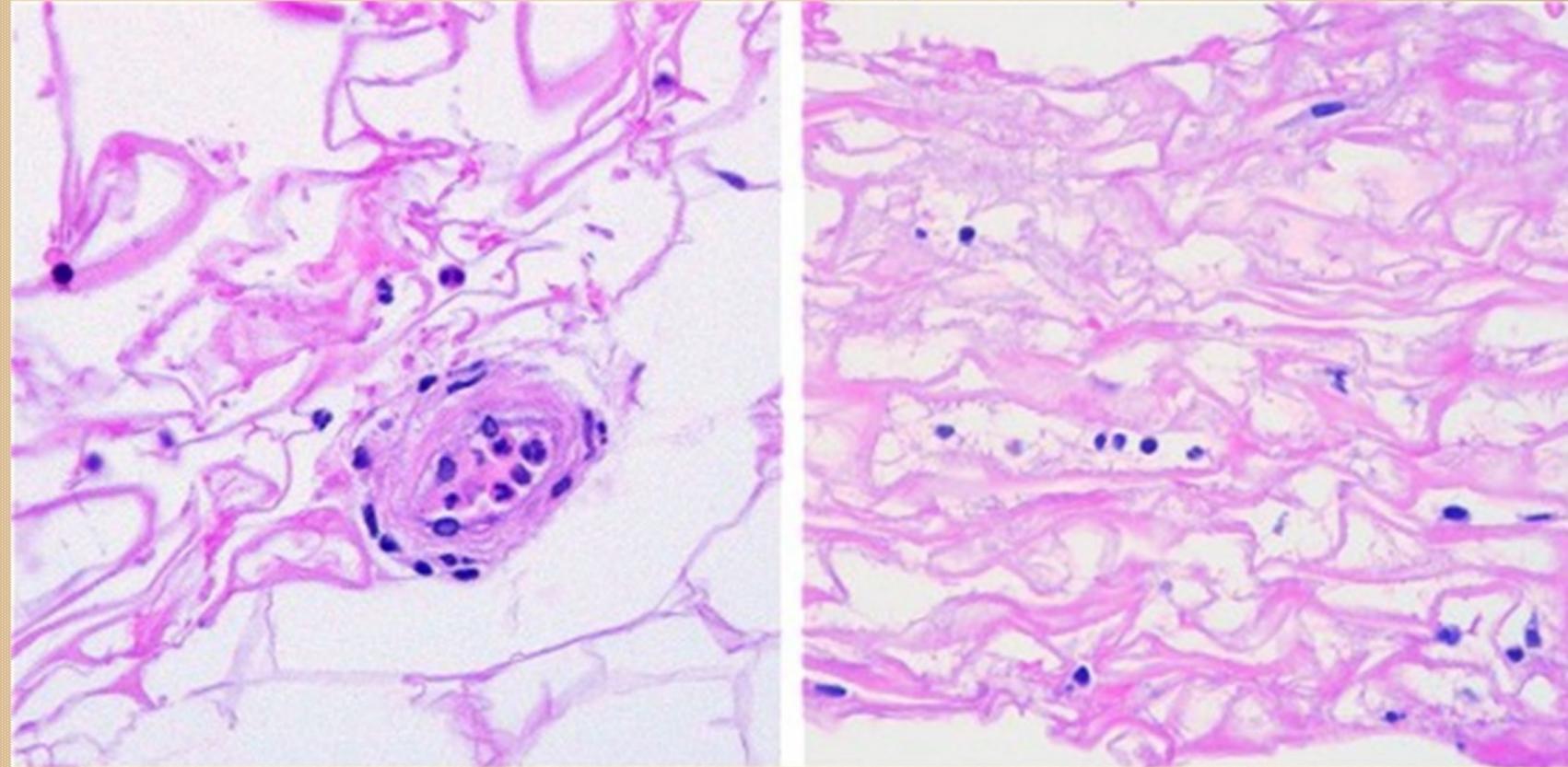
Acute Physiological Effects

Suppresses inflammation and its effects

Suppresses pathergy

Immediate closure of wound

Recognition as normal tissue



Biological Effects of Integra

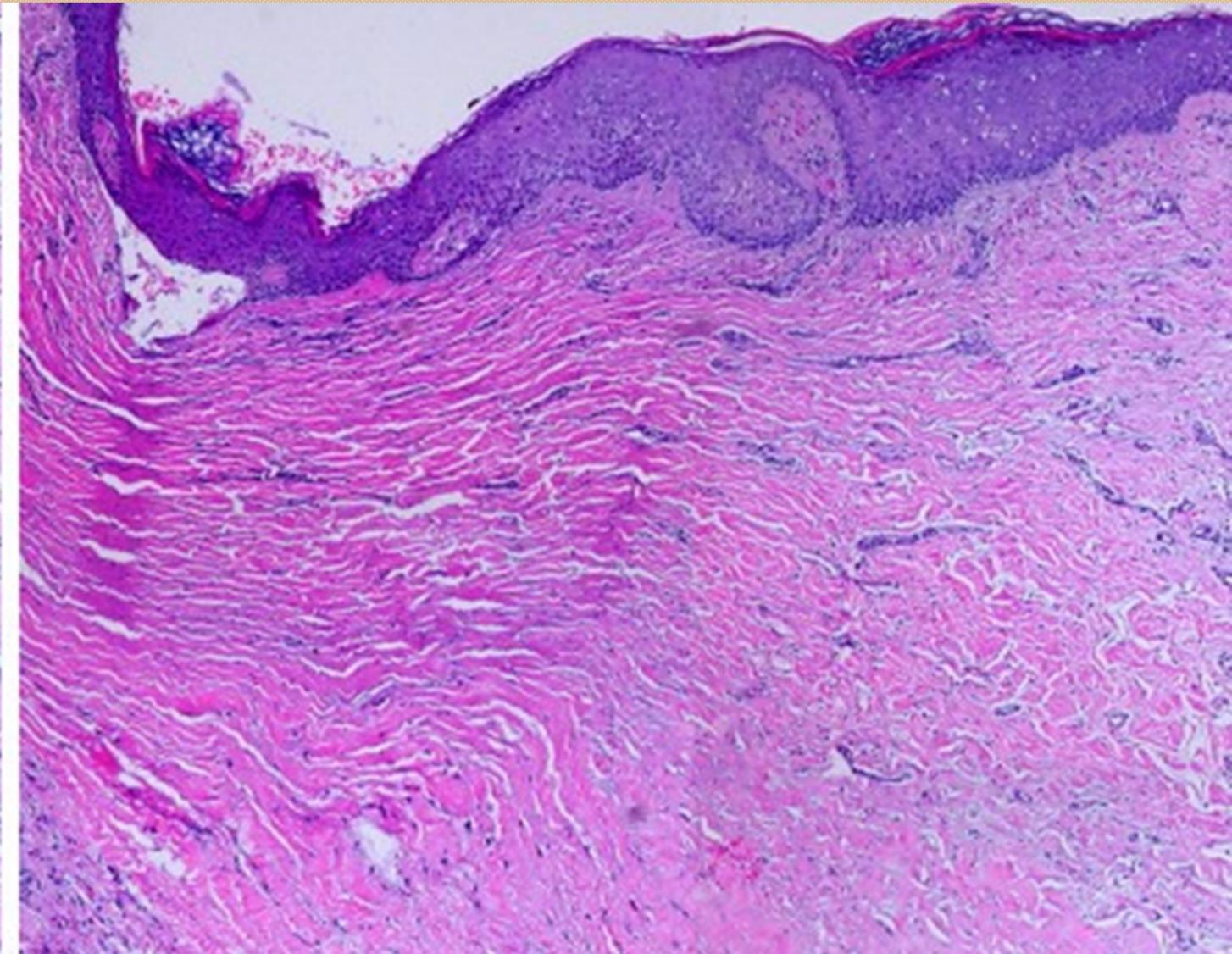
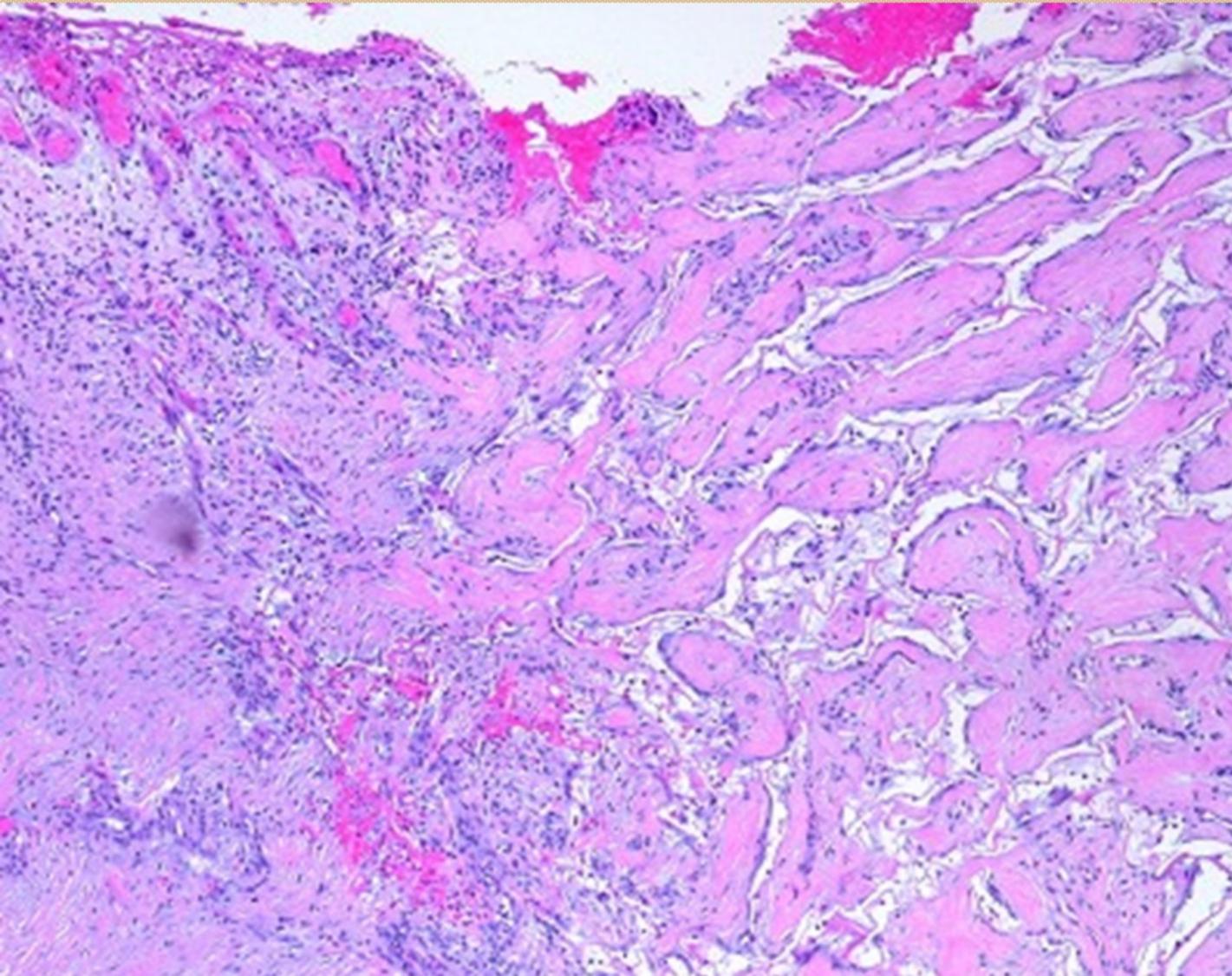
Sub-Acute Physiological Effects

Suppresses normal inflammatory wound repair

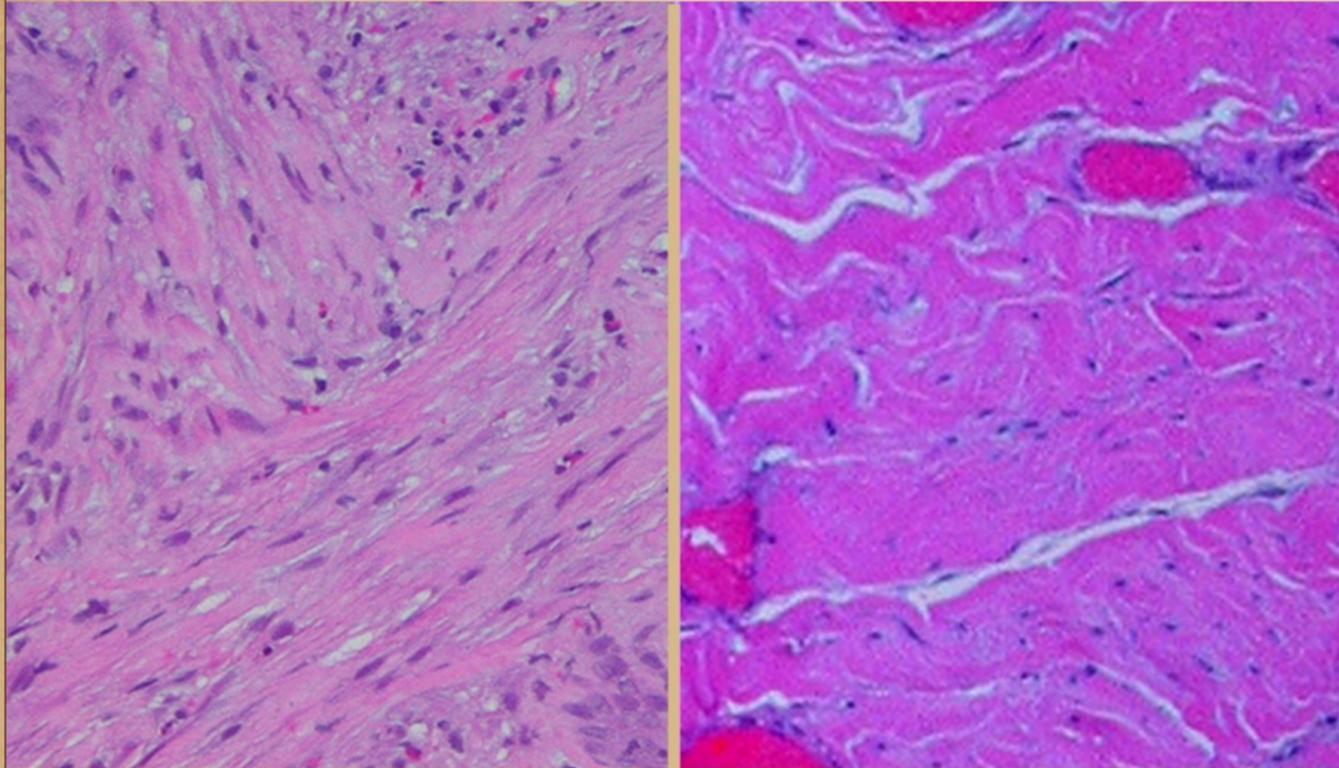
Induction of embryonic histogenesis

Formation of dermis

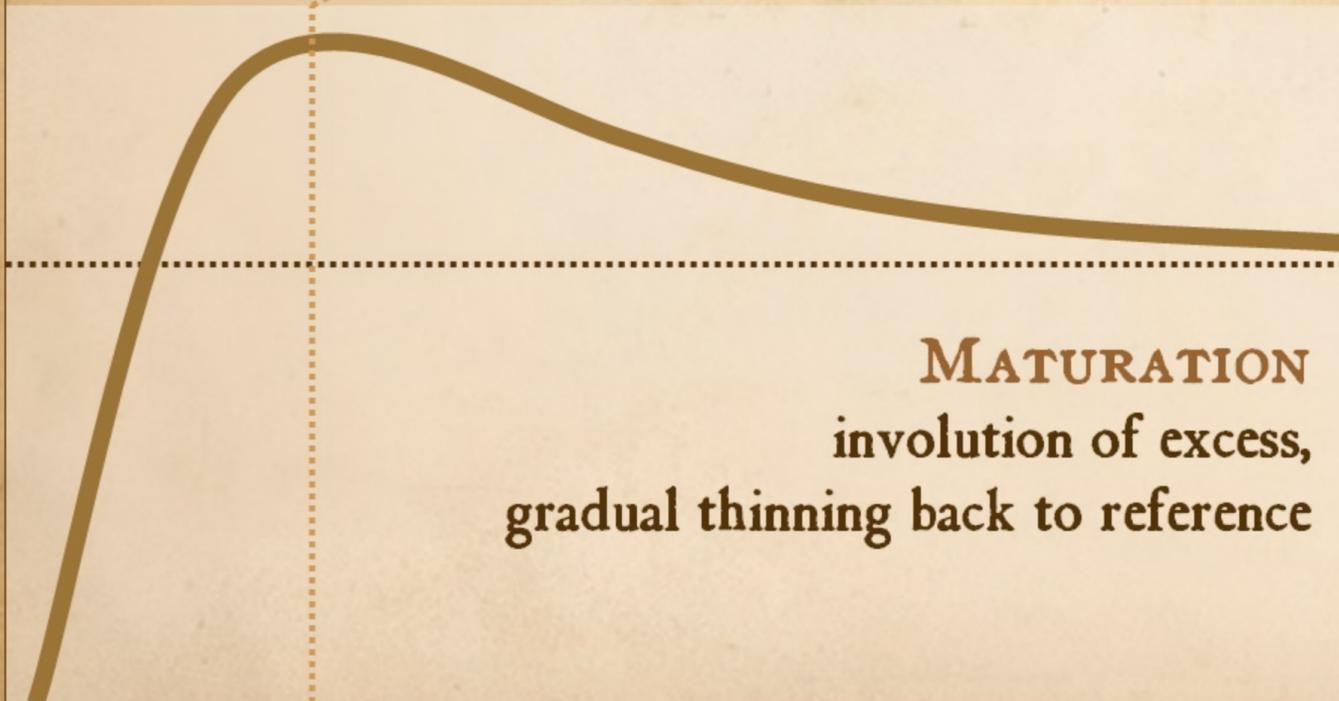
Avoidance of scar



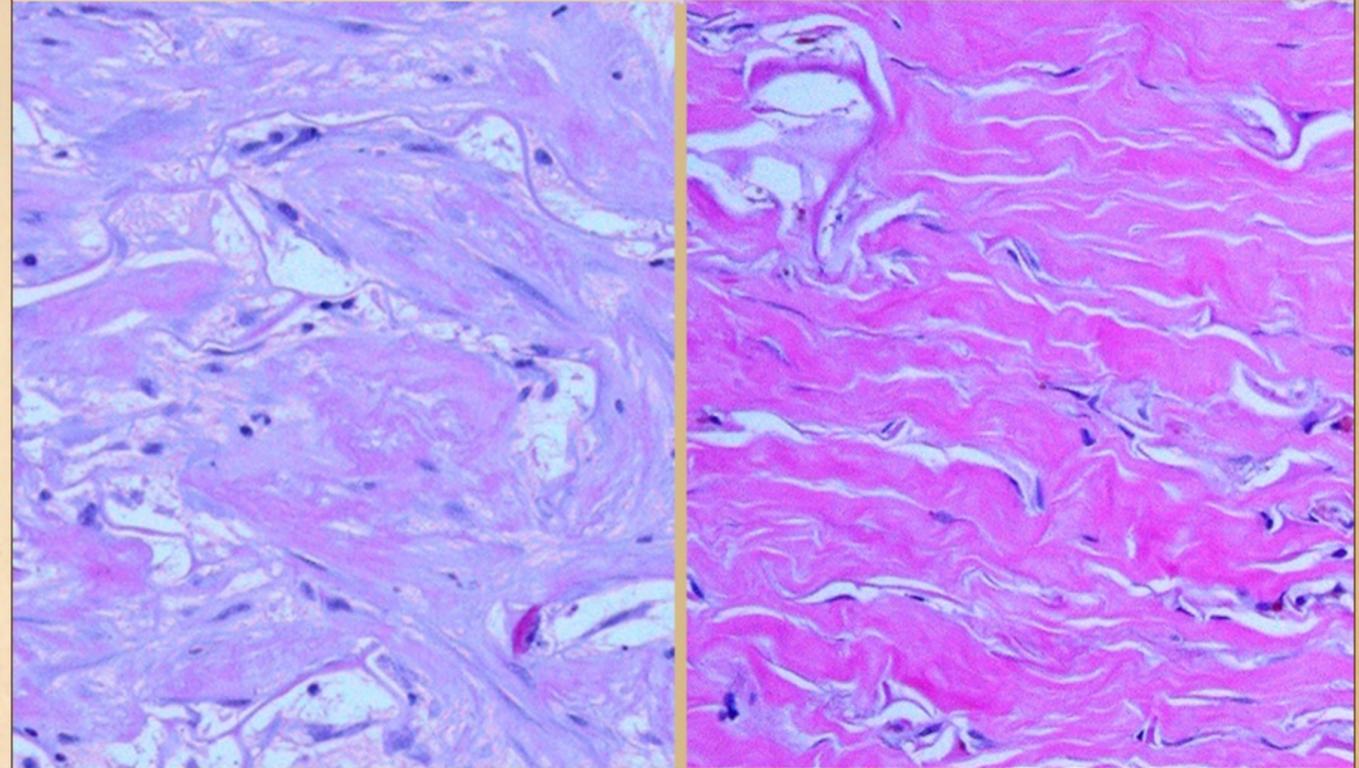
INFLAMMATORY WOUND HEALING OVERSHOOT, THEN INVOLUTE



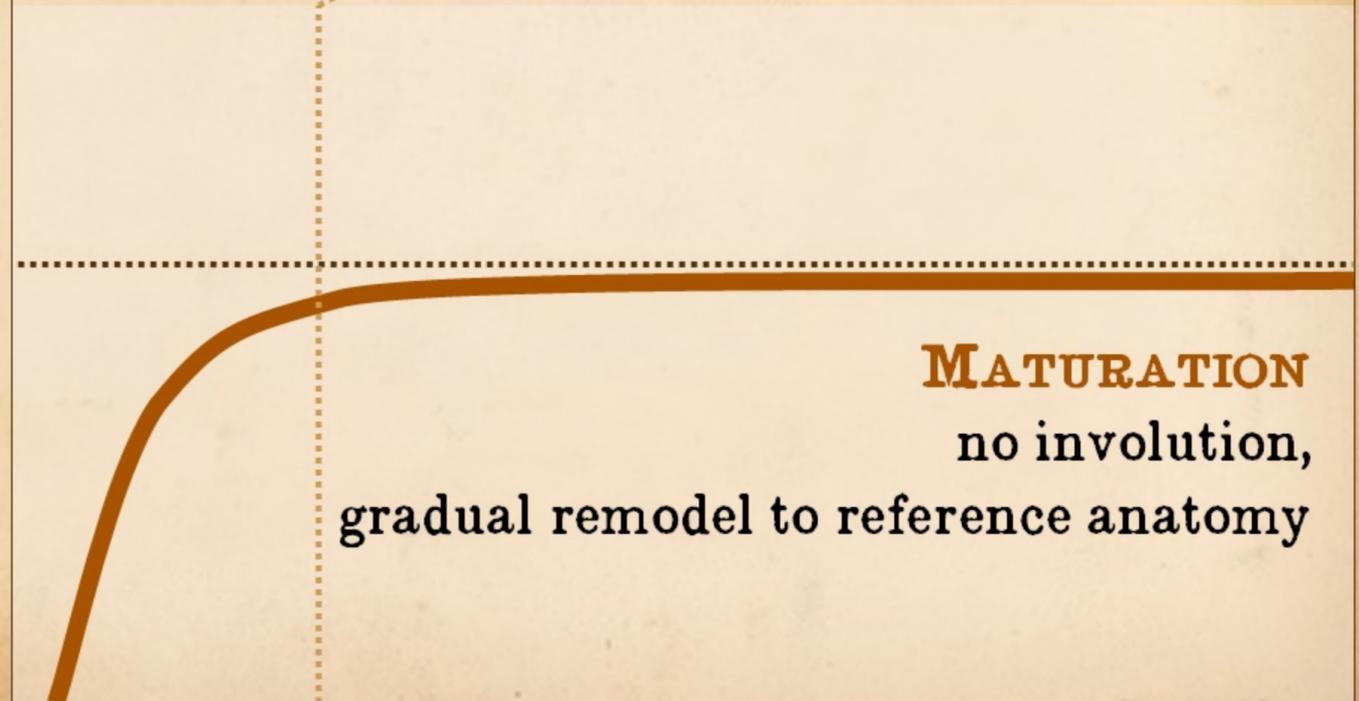
PROLIFERATION
auto-amplifying,
hyper-density,
open loop

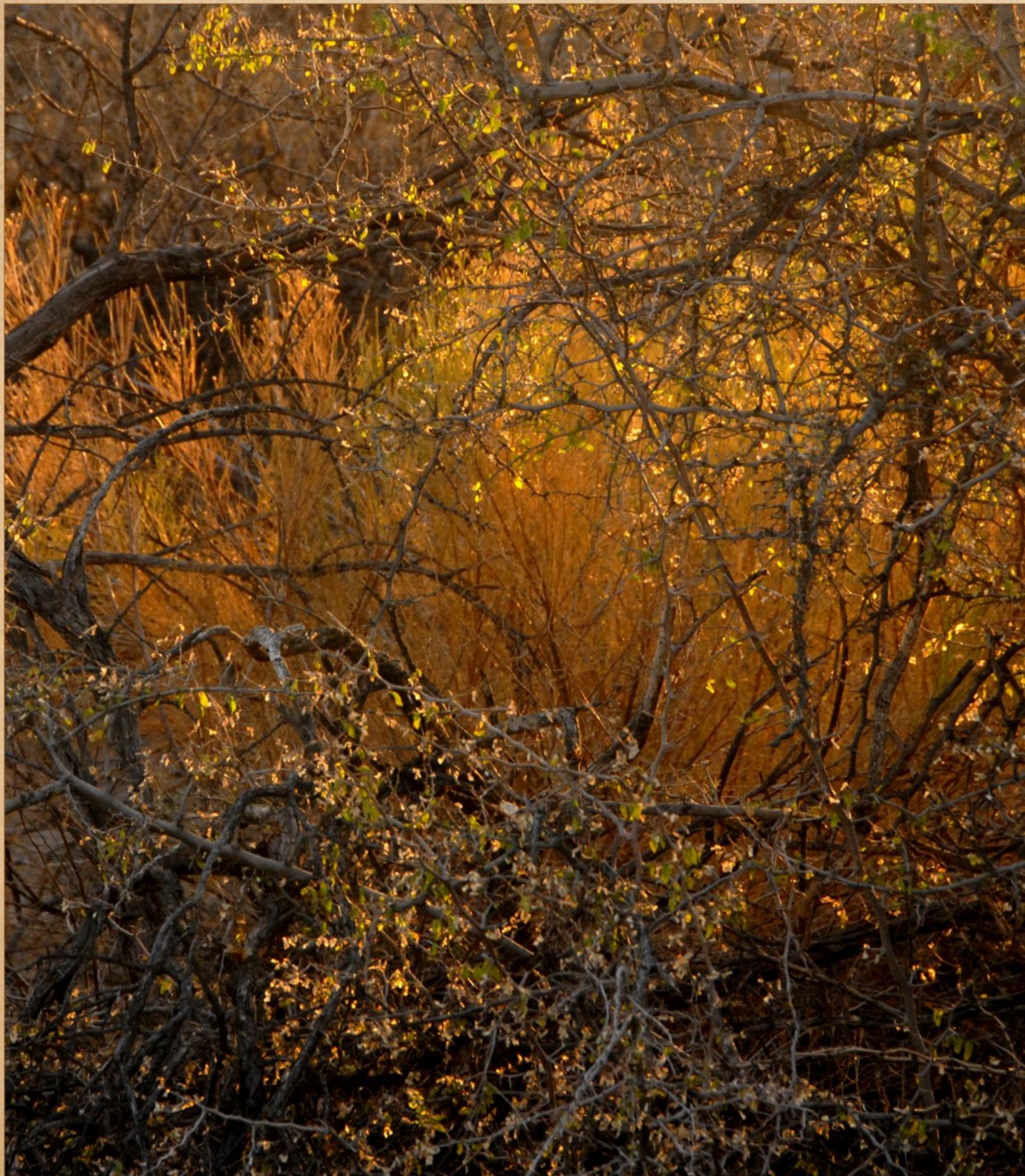


Integra Histogenesis GRADUALLY BUILD CORRECT MODEL



PROLIFERATION
proper density,
closed loop,
regulated





PRIMATRIX & SURGIMEND



NEONATAL BOVINE DERMIS
Dermal Template &
Regenerative Matrix

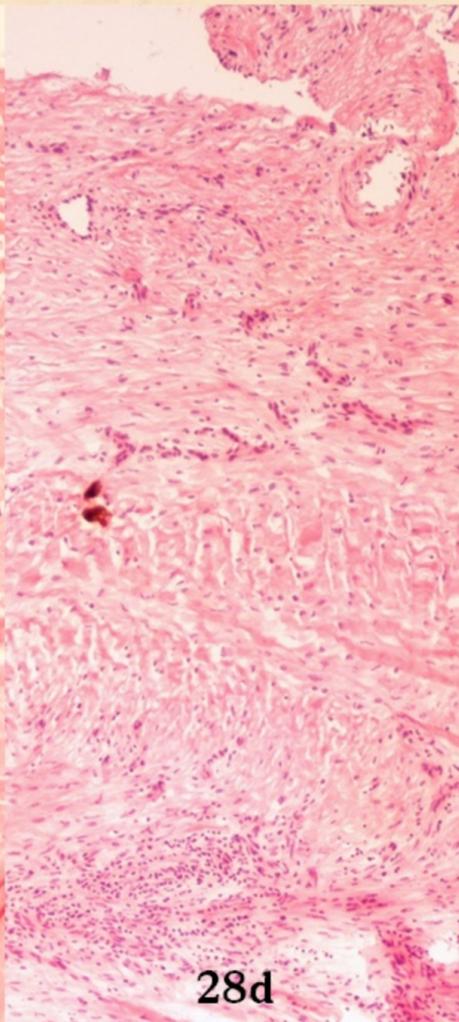
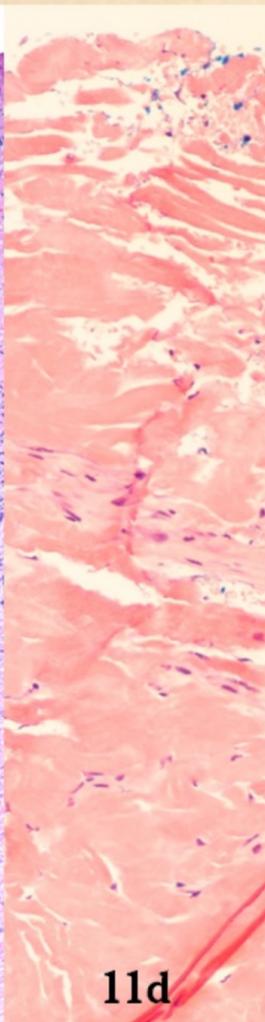
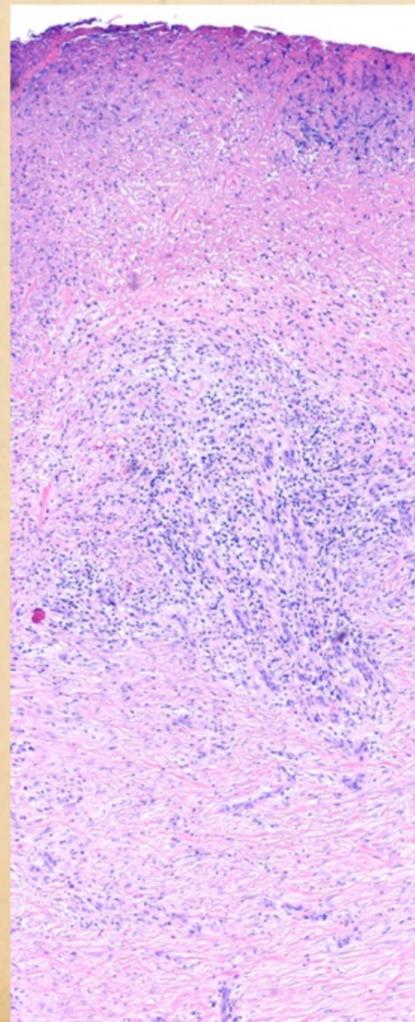


Integra

Native matrix lacks strength.
Connective matrix must be generated.
Human proteins and structure are assured.
Temporary epidermis (silicone).

Primatrix

Native matrix is very strong.
Connective matrix pre-exists.
Bovine structure must be remodeled.
No epidermis.

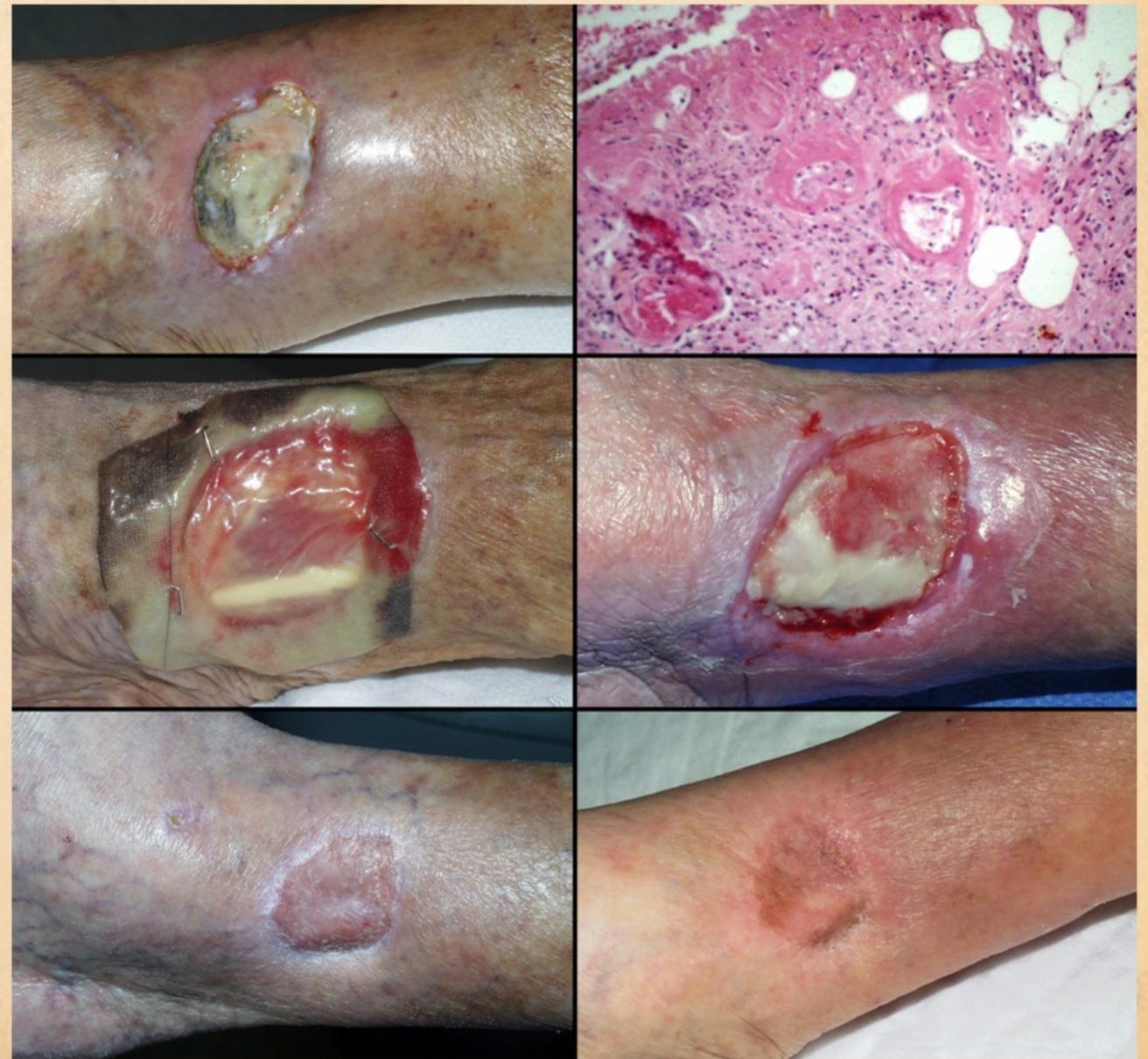


57 f, hypercoagulable-apls, mctd-lupus



THE RECONSTRUCTIVE UTILITY OF A DERMAL REGENERATION TEMPLATE

Chronic Wounds

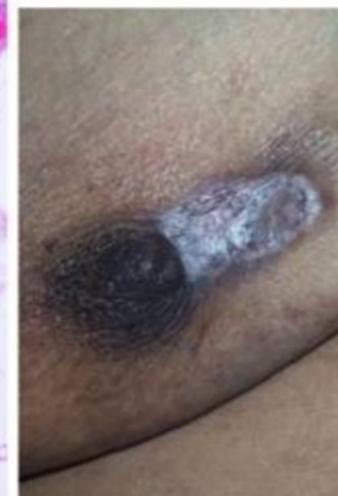
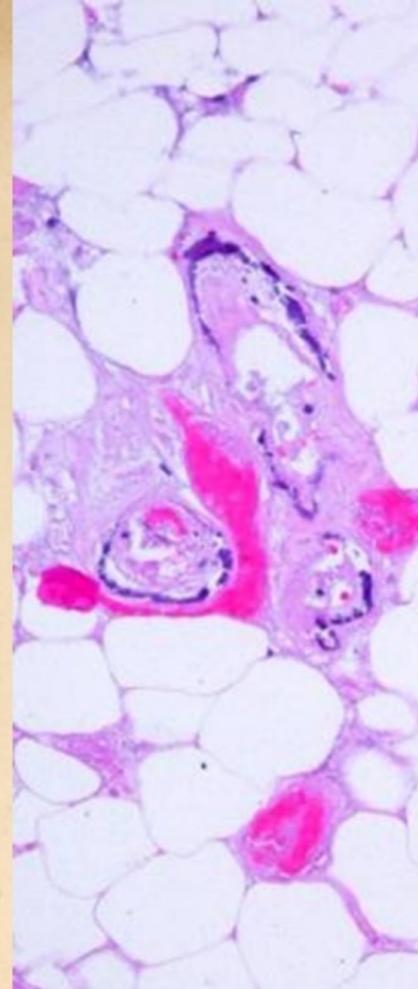




77 f, Sjögren's
77 m, rheumatoid

71 f, rheumatoid
86 f, venous





77 f, venous

51 f, diabetes, hPTH, calcinosis

74 m, aso, dm

44 f, mechanical, hypercoagulable



Integra for chronic pathological wounds - Outcomes, by diagnosis

Diagnostic category (% of patients per category)	fully healed	> 2/3 healed	< 2/3 healed	failed
Macro-arterial	58	8	16	18
Immunopathic	74	16	5	5
Venous / lymphedema	88	---	6	6
Hypercoagulable	86	---	14	0
Mechanical / anatomical	88	12	---	0
Radiation / malignancy	72	28	---	0
Diabetes / neuropathy	0	20	40	40
Unknown	60	20	20	0
Micro-occlusive	100	---	---	0
Trauma / surgery	100	---	---	0
Granulomatous / infectious	50	50	---	0
Adjunct	100	---	---	0
Total	71	10	10	9

Integra used to close chronic wounds.

120 patients.

90%
of exposed bones, joints, tendons and organs were successfully closed.

If patients now recognized as poorly selected are excluded (extreme arterial insufficiency, and diabetic plantar ulcers), the success rate for healed wounds was **92%.**

Gottlieb ME, Furman J: Successful Management and Surgical Closure of Chronic and Pathological Wounds Using Integra®. Journal of Burns & Surgical Wound Care, 3:2, 2004. (journalofburnsandwounds.com).

Gottlieb ME. Management of Complex and pathological Wounds with Integra. In: Lee BY, ed. The Wound Management Manual. New York, McGraw-Hill, 2004: 226-289. (ISBN 0-07-143203-5).

IN SITU TISSUE ENGINEERING WITH INTEGRA & PRIMATRIX REGENERATIVE MATRICES AND DERMAL TEMPLATES FOR RECONSTRUCTION AND WOUND CLOSURE

SUMMARY

arimedica.com

SUMMARY



Integra Collagen-gag Matrix: Key Biologic and Therapeutic Properties

TECHNICAL PROPERTIES

Single agent as both skin substitute and skin regenerant.
Not living, so it tolerates adverse conditions.
Suppresses inflammation and wound healing.
Induces embryonic regeneration.
In situ histogenesis.
Tangential histoconduction.

HIGH QUALITY ARTIFICIAL SKIN

Perceived by host as skin and a closed wound.
Protect wounds and structures.
Minimize symptoms, simplify care.

THERAPEUTIC EFFECTS

Suppress inflammation. Control pathergy.
Stabilize pathological wound behavior.
Prevent and avoid scar.
Independent of physiological wound healing.

SAFETY IN FACE OF RISK

Good results without donor sites.
Safe for high risk patients and conditions.
Safe surgery for immunopathy and ischemia.

CLINICAL UTILITY

Fills many of the roles of conventional flaps.
Succeeds where flaps are ineligible or fail.
Simplifies care.
Minimizes pain and nursing.
Facilitates recuperation, function, lifestyle.
Complex problems managed as an outpatient.

As a method of in situ tissue engineering independent of physiological wound healing, it is a paradigm of surgical wound repair with its own distinctive role for the closure of wounds and reconstruction of defects.

Summary

Study

72 months
111 patients
165 ulcers
173 exposed structures
full range of diagnoses

Results

71% - healed by Integra
20% - partial
9% - failed

90% - closure of exposed structures

92% success
if poor risk ulcers are eliminated
extreme arterial disease
diabetic plantar neuropathy



Management

Up to 7 months to heal
(acceptable to patients).
Ideally suited to outpatient care.
Superior safety profile.

Indications

Defined indications, related to:
complexity of wound,
anatomical complications,
high risk patients – wounds – diseases,
absence of conventional options.

Paradigm of Care

In situ tissue engineering.
Independent of repair, grafts, flaps.
Select Integra for its own merits.



INTEGRA

COLLAGEN-GAG MATRIX

DERMAL REGENERATION
TEMPLATE

Versatile

RECONSTRUCTIVE AGENT

for
a broad range of pathologies,
clinical problems, and
anatomical areas.

Solves problems when flaps should
be used but cannot be used.

Characteristics like dermis -
no scar, no contractures.

Solves wound healing impaired
chronic and pathological wounds.

PRESENTATIONS ARE ON THE WEBSITE

arimedica.com

ARIMEDICA.COM/PRESENTATIONS.HTM

ARIMEDICA.COM/SUBJECTS_INTEGRA.HTM

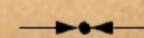
Managing Complex and Pathological Wounds with Integra - A Gallery of Cases (et al)



Diversity and delight in the desert.



Spring Sunset in the Sonoran Desert



Something inspirational in unexpected places.

ספר הנחמה

