

# **A Comparative burn wound model in a Duroc pig for the histopathological evaluation of local therapeutic regimes: DuoDerm E and Elasto-Gel**

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# Background

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- So many dressings, and they all claim to be better than ....
- How can we obtain objective information which will tell us what the dressing does exactly on the wound.
- We believe that the macroscopic evaluation should be accompanied by a histological evaluation.



# The pig model

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- Pig skin is histological close to the human skin
- Make identical burn wounds
- The pig is his own control
- When difference in parameter is more than 30% then statistically one pig is enough.
- This experiment is not possible in humans



# 6 equal wounds on each flank



# Research questions

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- Which dressings shows the fastest epithelialization ?
- How long can the dressing stay on the wound ?
- How fast is granulation tissue growing in the wound ?
- What is the scar outcome during and after the treatment?
- What is the bacterial load in the wound during the treatment ?



# Materials and methods

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- One Duroc pig (red hared)
- Twelve areas 7 by 7 cm (6 on each flank)
- Deep dermal burns were inflicted by applying a brass block of 6.7 x 6.7 cm, weighing 450 grams.
- The block was heated up to 170°C and was applied during 20 seconds without additional pressure.



# Jean-Luc the Duroc pig

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# Results : Macroscopically

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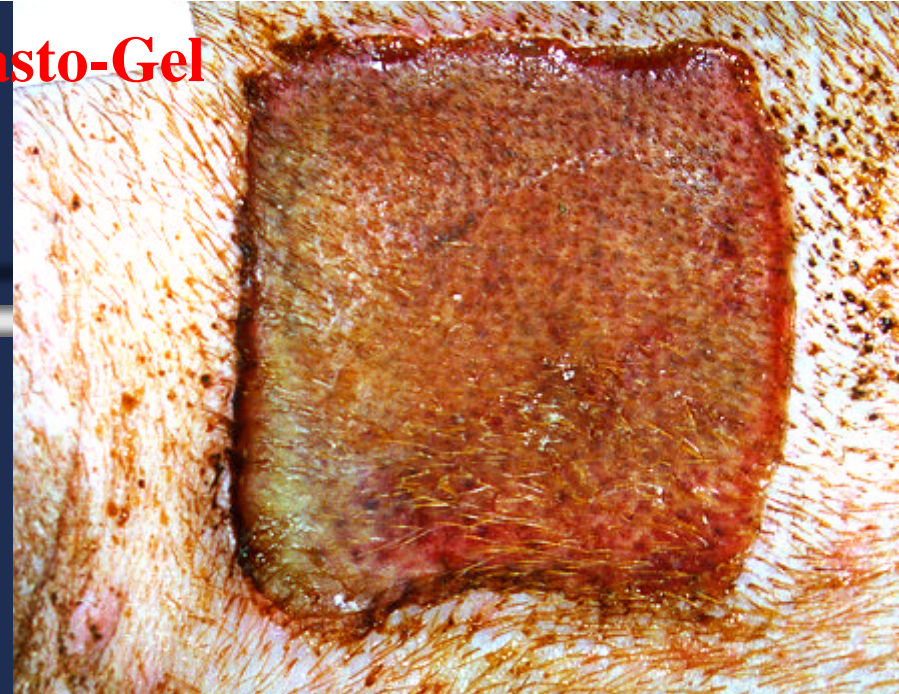
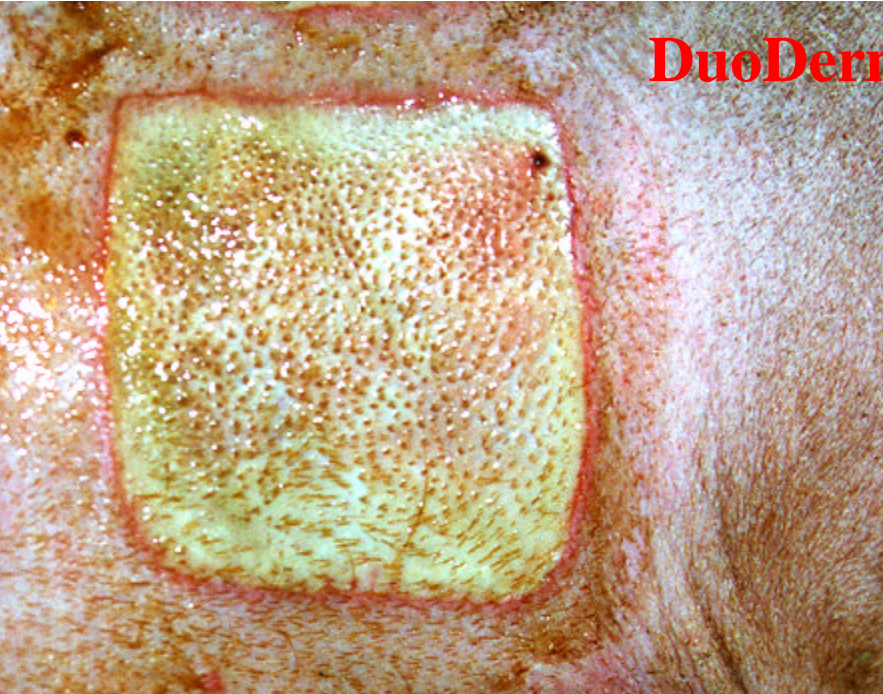
- After 7 days we see that the crust is becoming plastisized under Elasto-gel.
- The dead tissue under DuoDerm E dissolves and no real crust is visible.
- Epithelialization is faster under DuoDerm but at pbd 21 the epithelium is becoming open again.
- The DuoDerm E treated wounds have a typical odor.
- At the end (pbd 43) there is no difference.



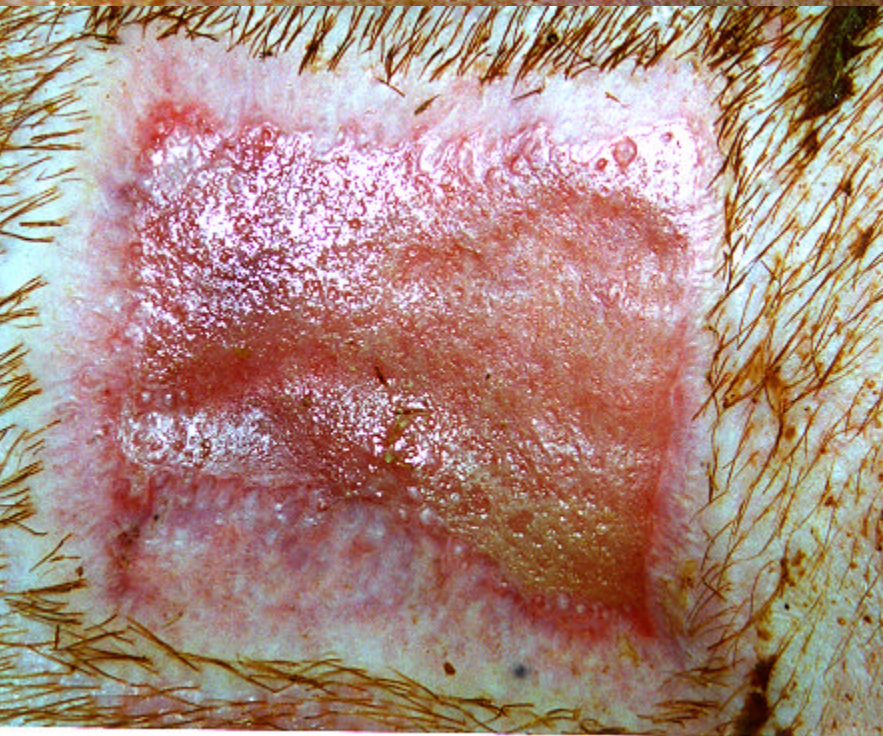


## DuoDerm E Vs Elasto-Gel

Pbd 7



Pbd 14

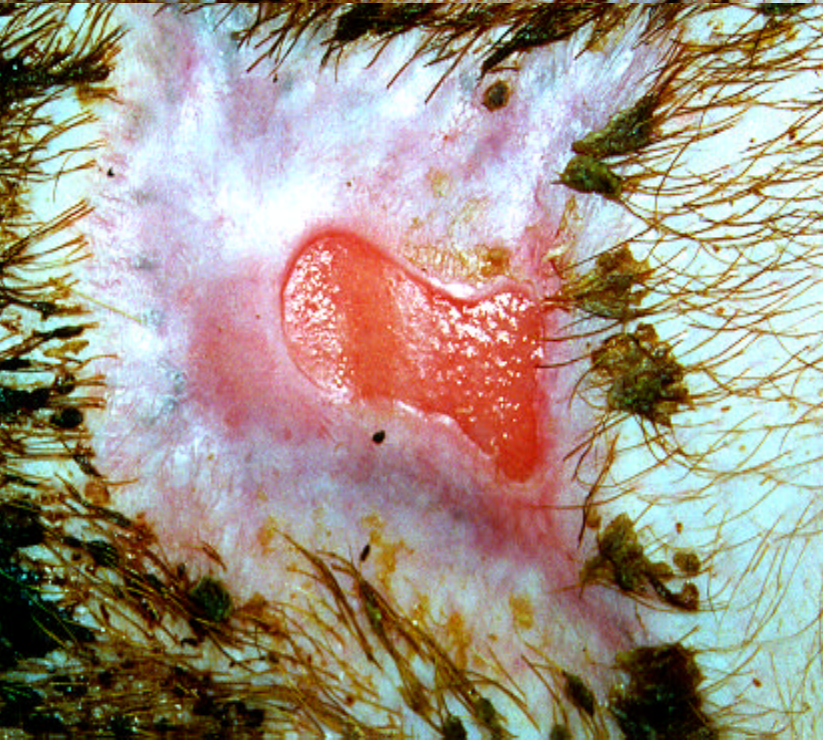




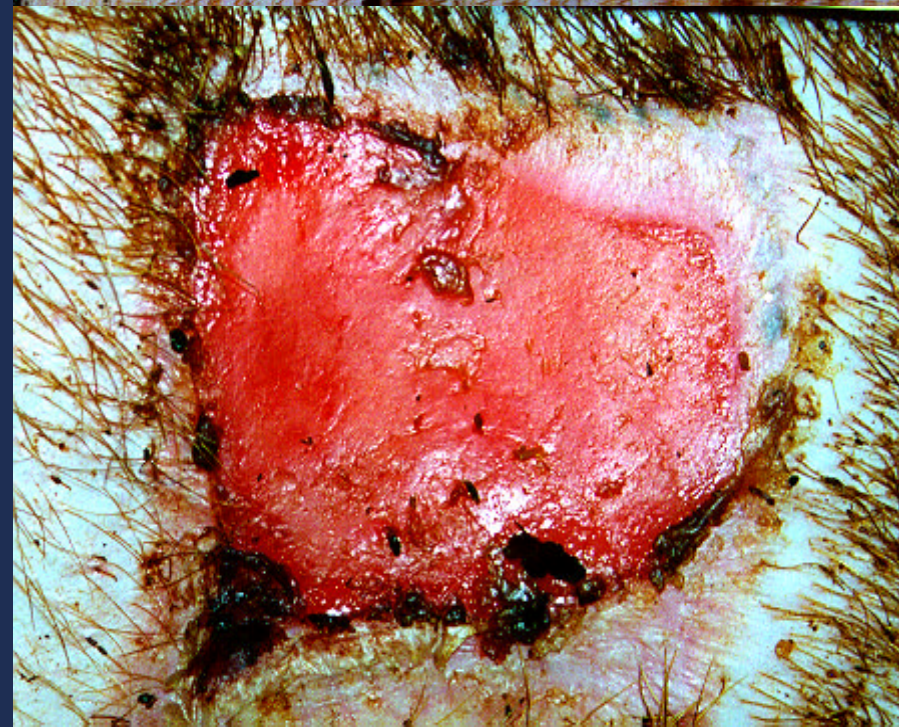


**DuoDerm E Vs Elasto-Gel**

**Pbd 21**

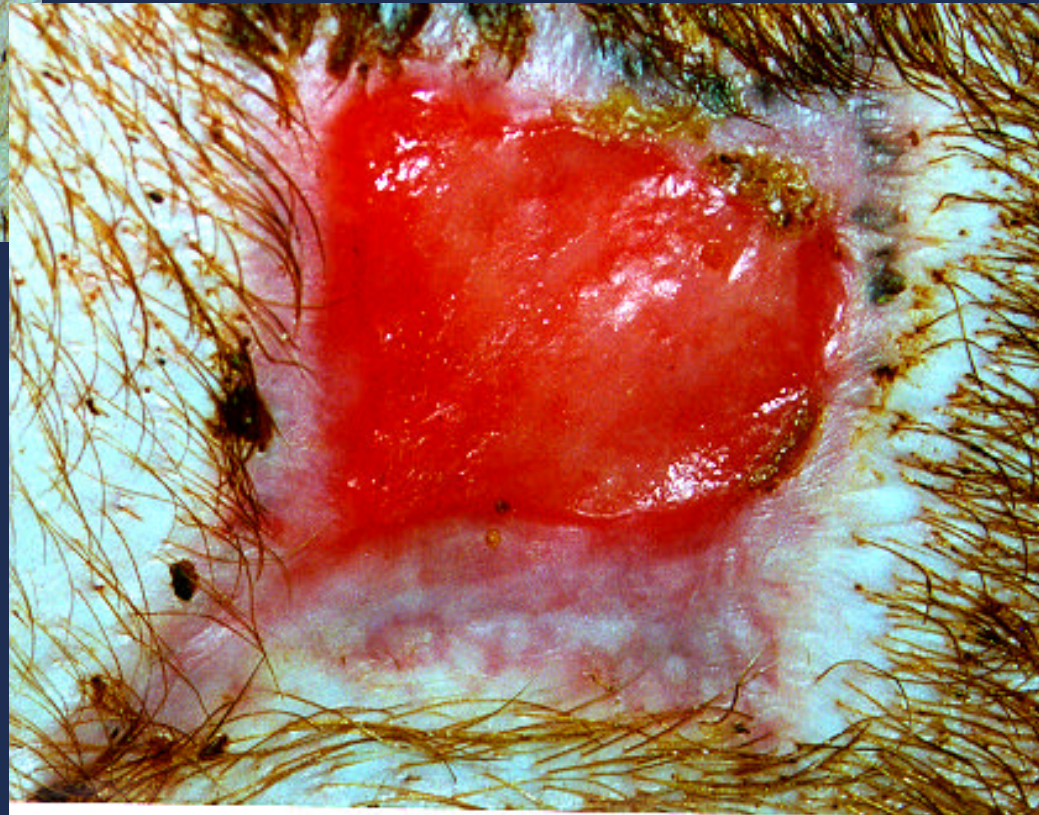


**Pbd 29**





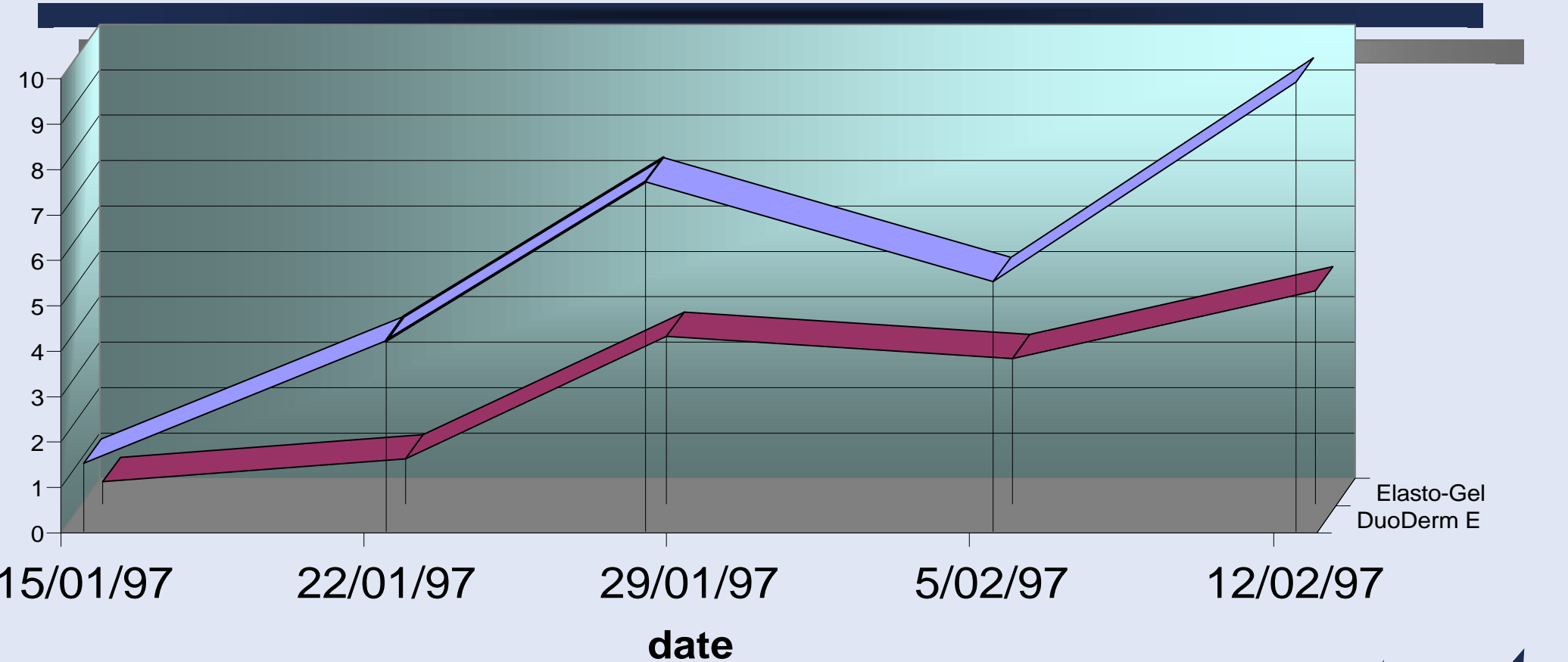
**<= DuoDerm E ,pbd 36**



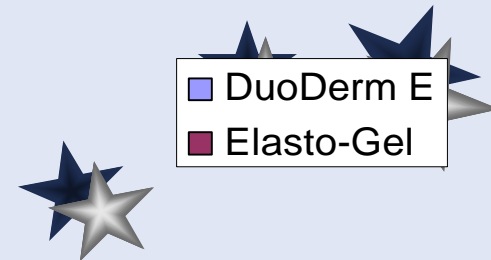
**Elasto-Gel, Pbd 36 =>**



# Central ulcer scar thickness in mm



DuoDerm E  
Elasto-Gel



# Microscopically (1)

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- The thickness of the granulation tissue during the healing under the two dressings is significantly different.
- The build up of granulation tissue shows the same pattern under the two dressings
- The granulation build up is 50% to 60% higher in DuoDerm E in comparison to Elasto-Gel.



# Microscopically (2)

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- Under Elasto-Gel there are almost no bacteria present during the whole treatment.
- Under DuoDerm E we find a fully colonized wound during the first 3 weeks and then the amount of bacteria drops fast.
- There is an abundance of fibroblasts in the DuoDerm E treated wounds and a higher inflammation reaction.
- This is the opposite in the Elasto-Gel treated wounds.





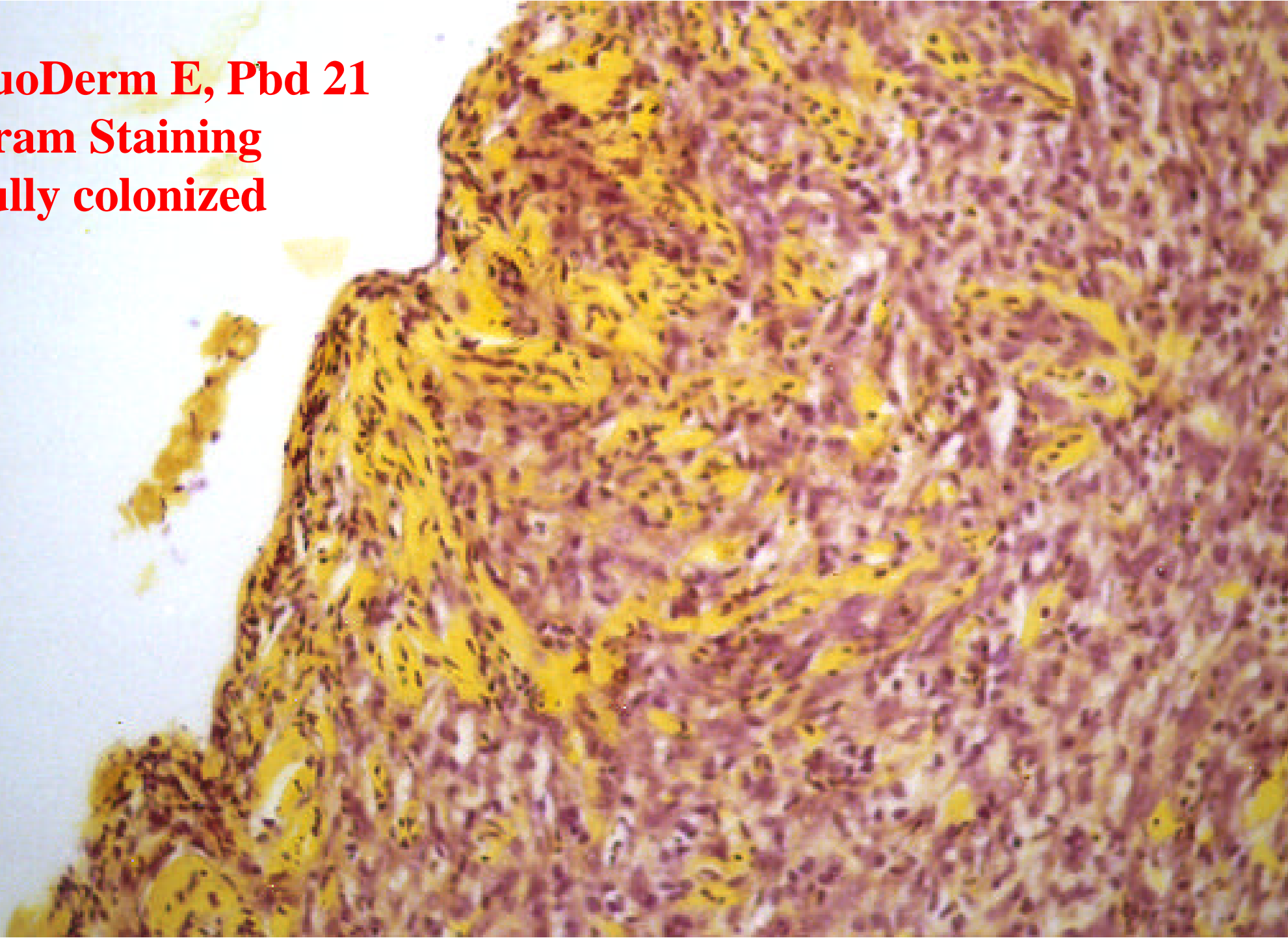


A histological section of DuoDerm E, Pbd 21, showing granulation tissue. The tissue is stained with hematoxylin and eosin (H&E), resulting in a pinkish-purple hue. The granulation tissue is characterized by a dense, irregular arrangement of cells and fibers. A dark, wavy line runs horizontally across the middle of the image, likely representing a blood vessel or a fold in the tissue. Two black arrows point towards the tissue from the left and right sides, indicating the area of interest.

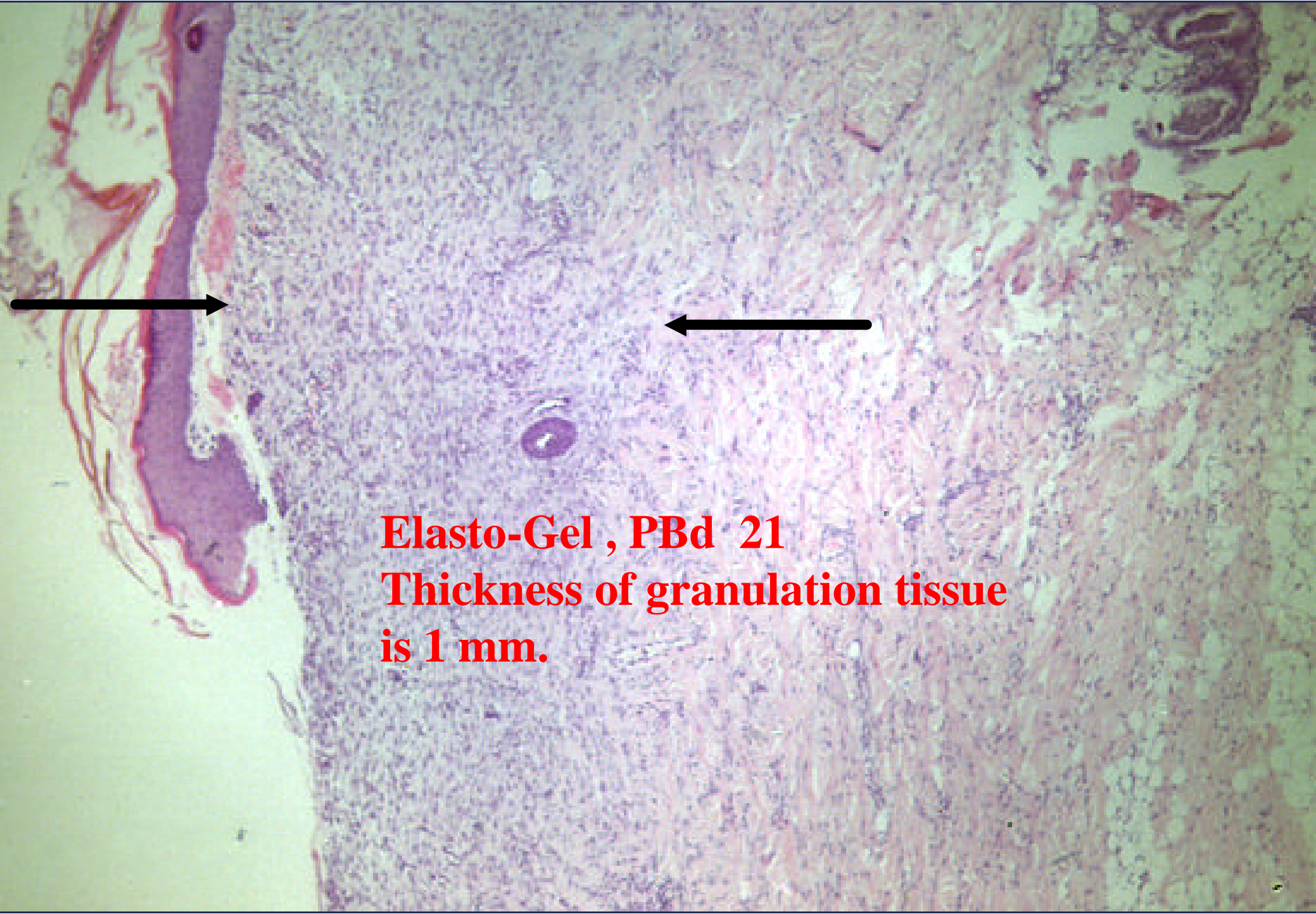
**DuoDerm E , Pbd 21**

**Thickness of granulation tissue is 4.2 mm**

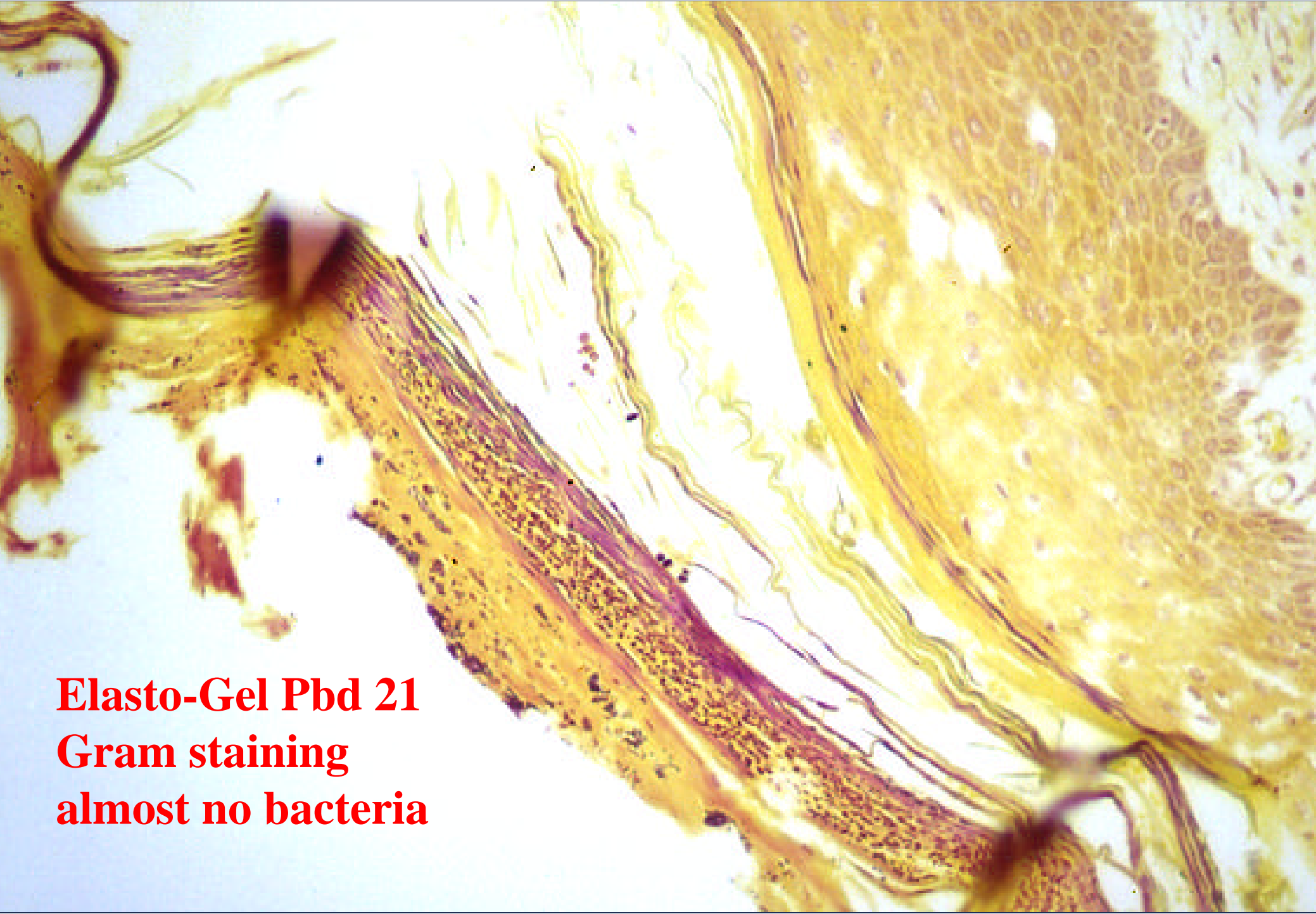
**DuoDerm E, Pbd 21**  
**Gram Staining**  
**Fully colonized**







**Elasto-Gel , PBd 21**  
**Thickness of granulation tissue**  
**is 1 mm.**



**Elasto-Gel Pbd 21**  
**Gram staining**  
**almost no bacteria**

# Discussion (1)

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- The use of an animal model gives us more information.
- The high amount of bacteria under the DuoDerm E treated wounds could explain the odor and the higher inflammation with as result the higher granulation tissue build up.



# Discussion (2)

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- The almost absence of bacteria under the Elasto-Gel treated wounds could explain the lower inflammation and the absence of odor and consequently the slower build up of granulation tissue.
- The higher reaction of the macrophages could be due to the glycerine (Elasto-Gel consist of 65% glycerine) but why is not answered yet.



# Future

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- The pig is still alive and we will wait another 3 months and see if there is a difference in scar outcome between the two dressing regimes.
- Additional pig studies are needed
- Additional test on the cellular level are needed to clarify the role of glycerine.



# Conclusion (1)

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- In burn wounds we do not want the wound to scar to much (hypertrophic scar and keloids).
- We now that the formation of granulation tissue is an unwanted phenomenon in healing burns.
- So we have shown that the formation of granulation tissue under Elasto-Gel is 60% lower than under DuoDerm E in deep 2nd degree burns in a Duroc pig model.
- This might lower the possibility of an hypertrophic scarring !!!



# Conclusion (2)

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- So we have shown that the formation of granulation tissue under Elasto-Gel is 60% lower than under DuoDerm E in deep 2nd degree burns in a Duroc pig model.
- Elasto-Gel might lower the possibility of hypertrophic scarring in burns !!!

