



# **Human Adipose-Derived Stem Cells and their clinical applications**

# Stem Cells

- Embryonic stem cells. Embryonic stem cells come from human embryos that are three to five days old. ...
- **Adult stem cells.** ...
- Induced pluripotent stem cells (iPSCs) ...
- Placental ( cord and cord blood) stem cells and amniotic fluid stem cells.

# Human Adipose-Derived Stem Cells and their clinical applications

- Adipose-derived stem cells (ASCs) are one of mesenchymal stem cell types. They are self-renewal and multipotent stem cells.
- ASCs also have the potential to treat various diseases,

# isolation of ASCs

## Liposuction

- Firstly ASCs reside in the **stromal vascular fraction (SVF)** of adipose tissue
- Liposuction.
- General anaesthesia significant morbidity and risk of mortality under.
- local anaesthesia



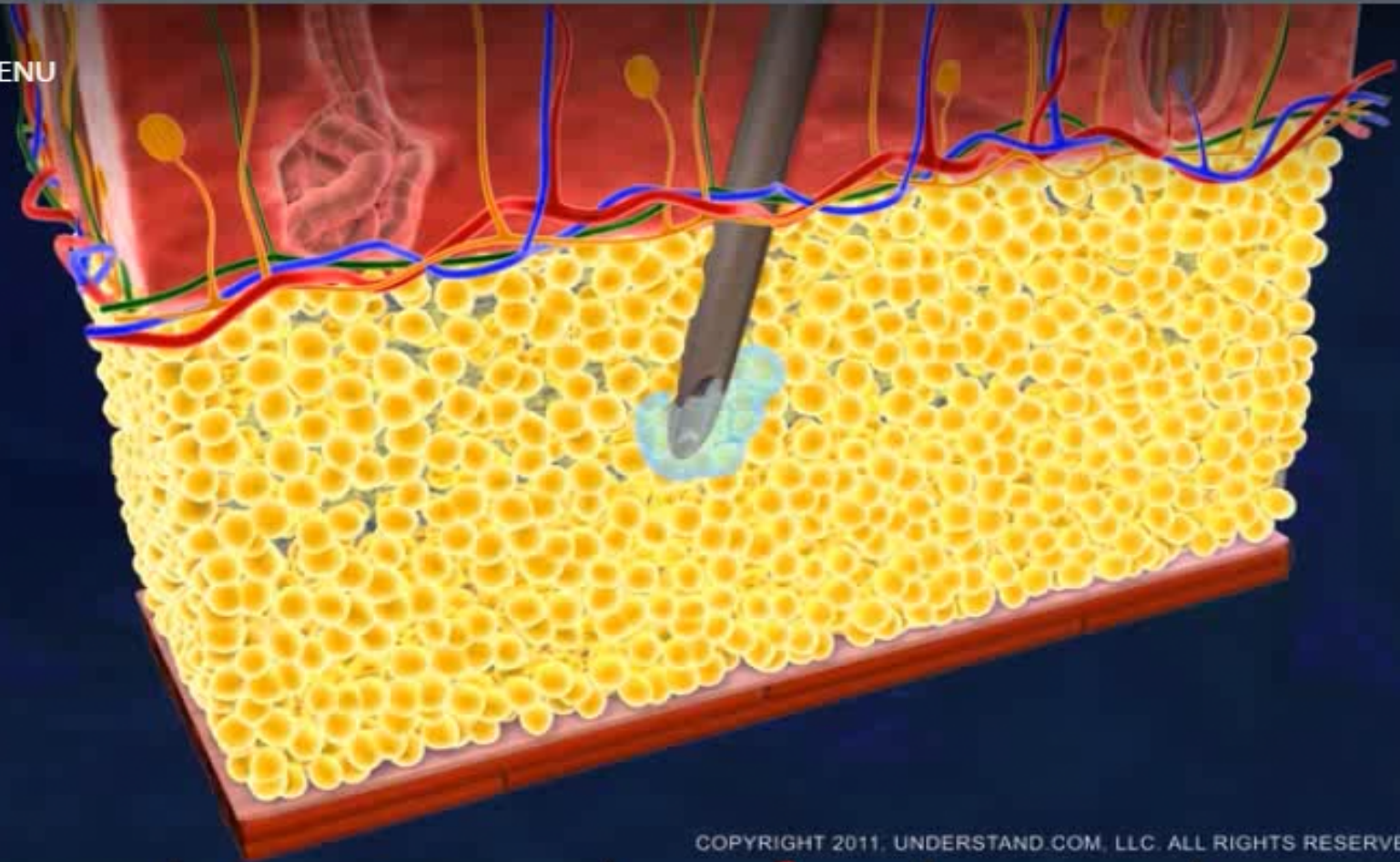
# tumescent liposuction

- The procedure of microcannular tumescent liposuction consists of two steps:
- Tumescent anaesthesia:
- Aspiration of fat by microcannular liposuction:

# tumescent infiltration and Liposuction

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A

27 JUL 2007 06:11

R F 10 MHz  
D 4 cm  
PRC 6-4-L  
PST 4

G 97%  
PRS 4

0:00:01.12

VENOUS

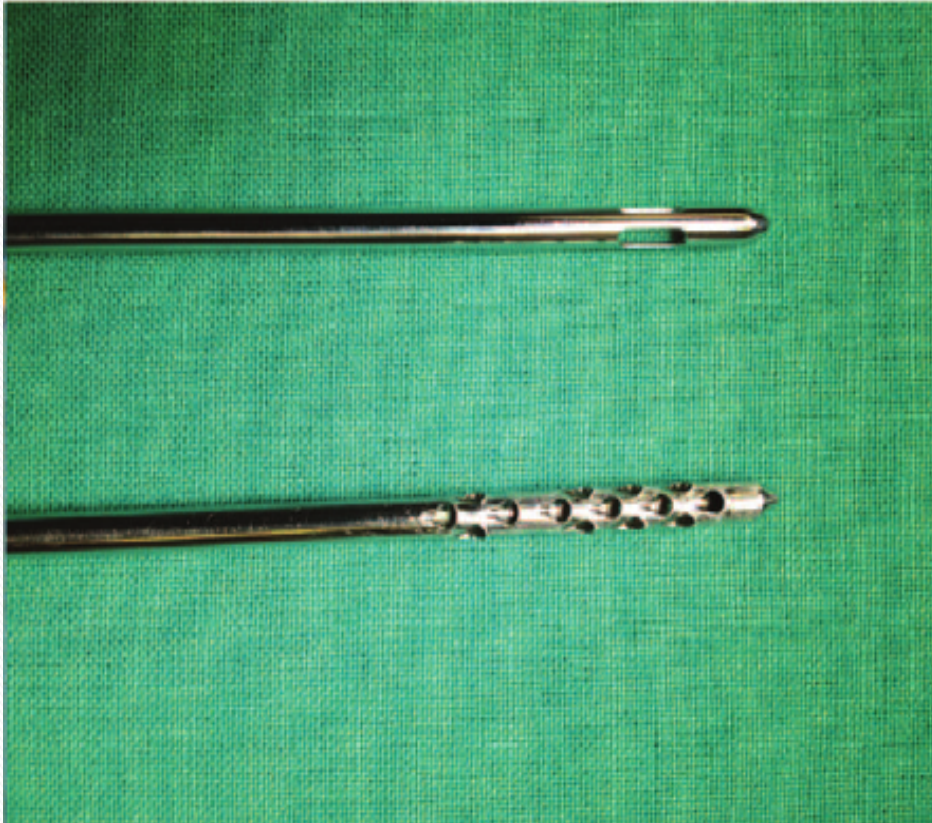
LA-435



# Needles for Tumesccent infiltration



# Liposuction

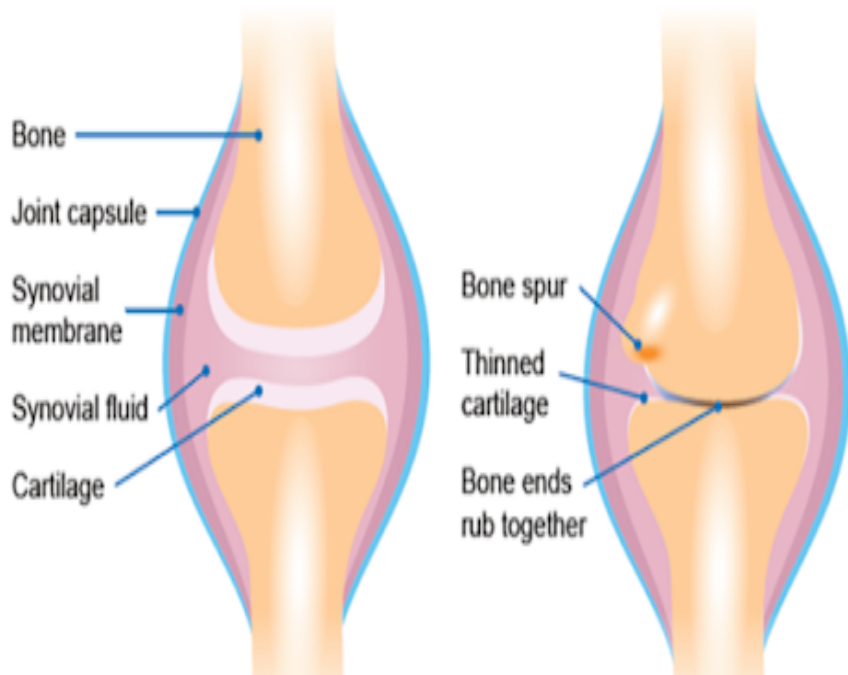




# Washing of SVF for Direct injection



# Direct injection of SVF





# Direct injection of SVF





# SVF culture for ASCs enrichment

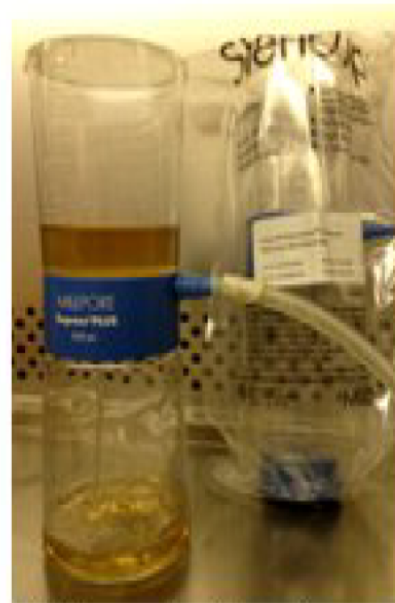
## A: materials



Sterile  
1X PBS



0.075 – 0.1%  
Collagenase 1A

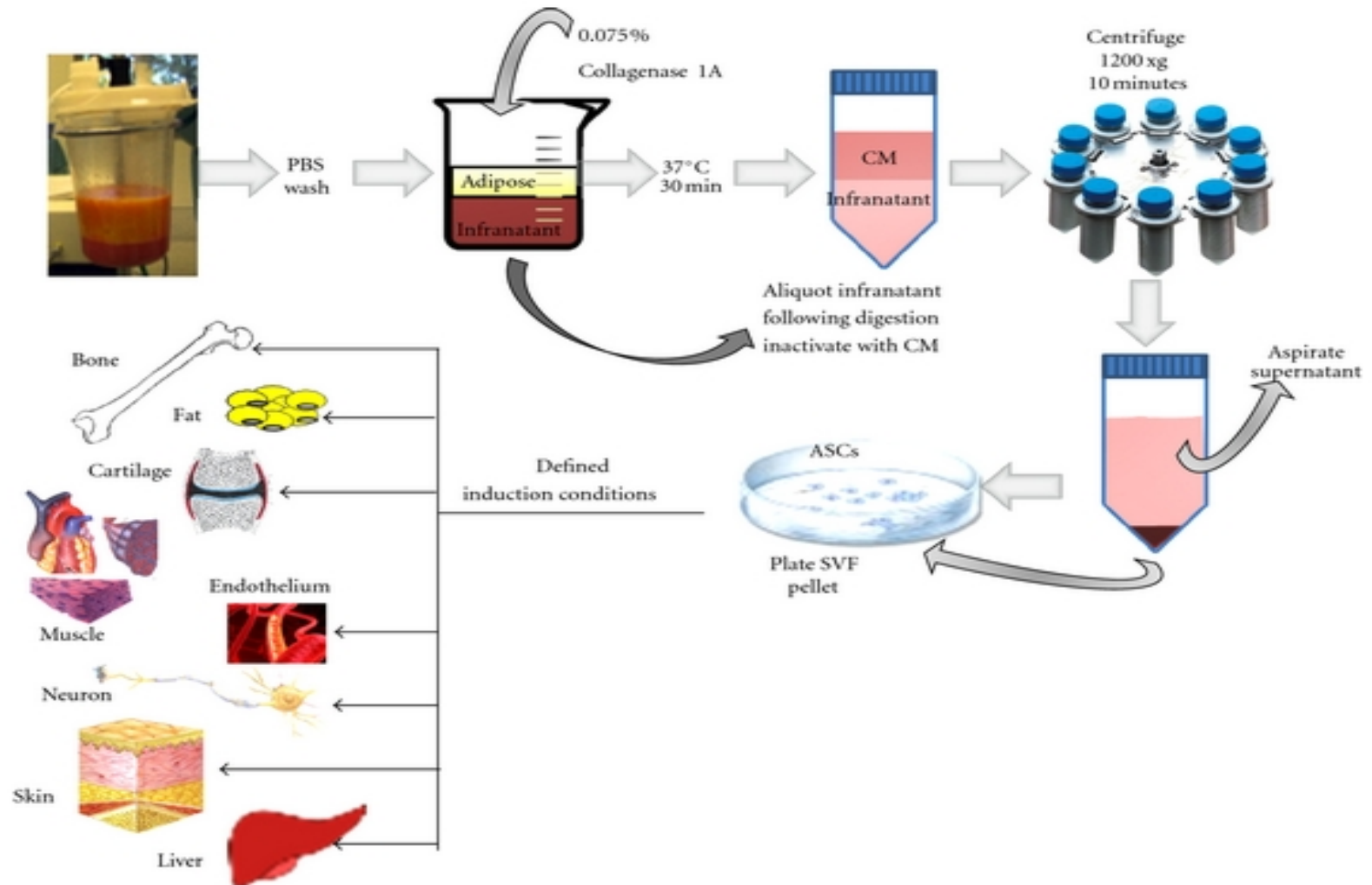


Filter sterilized  
Collagenase Sol'n



Control Medium for ASC culture

# isolation of ASCs from lipoaspirates



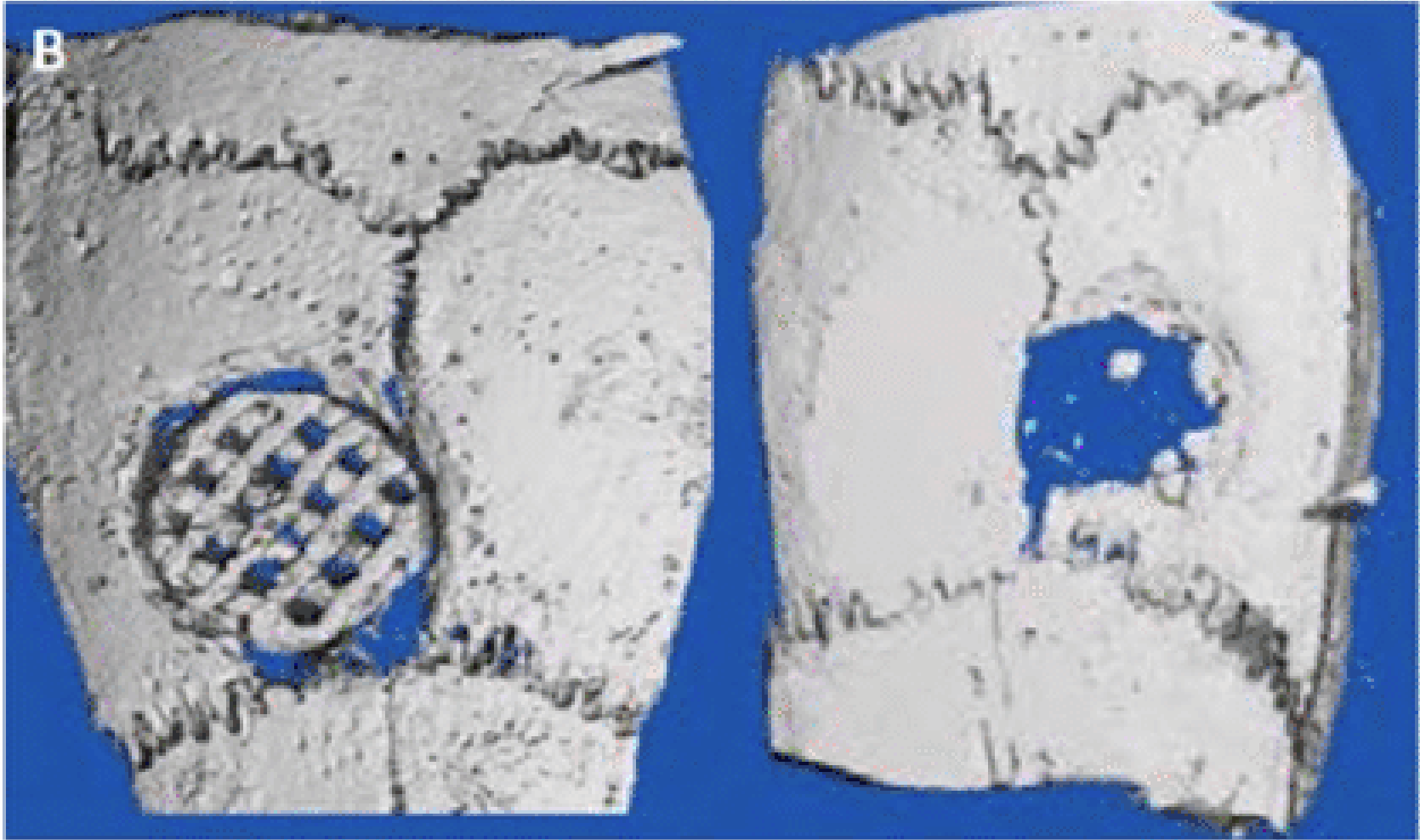
# Differentiation of ASCs

Osteogenic differentiation:

Adipogenic differentiation:

Chondrogenic differentiation:

# 3D-bioprinted



# tissue-engineered cartilage of ASCs

