



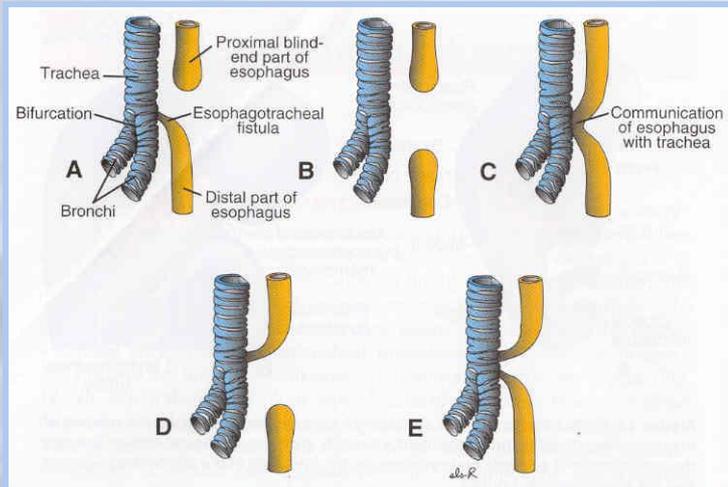
Remplacement œsophagien par Ingénierie Tissulaire



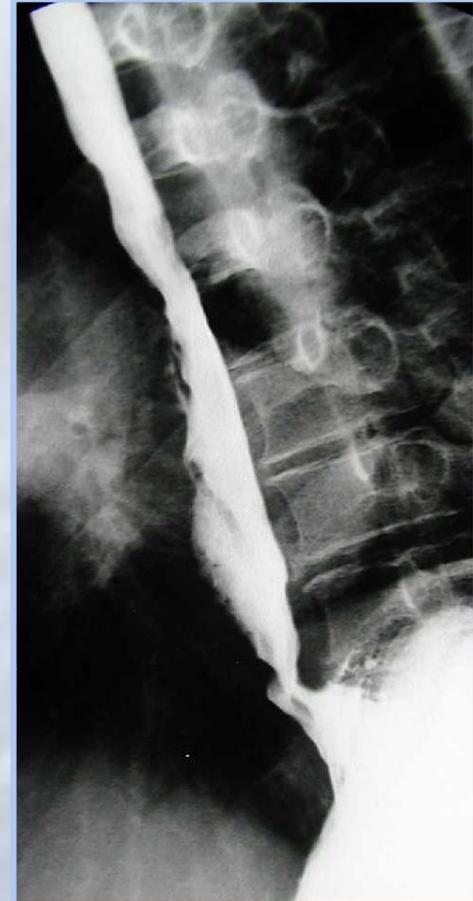
Pierre CATTAN
Service de Chirurgie Générale, Digestive et Endocrinienne
Unité de Thérapie Cellulaire
CIC-BT 501 - INSERM UMR 940
Hôpital Saint-Louis



Indications de remplacement œsophagien



Atrésie de l'œsophage

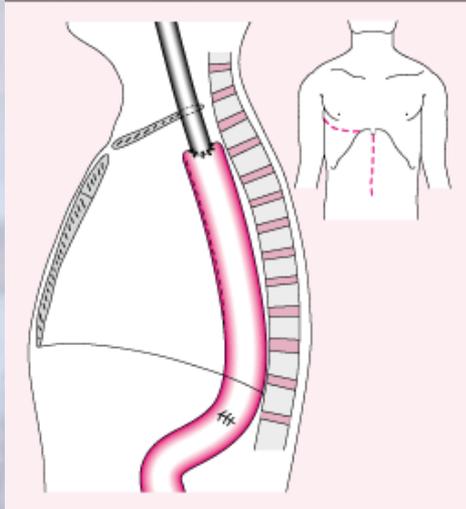


Cancer de l'œsophage

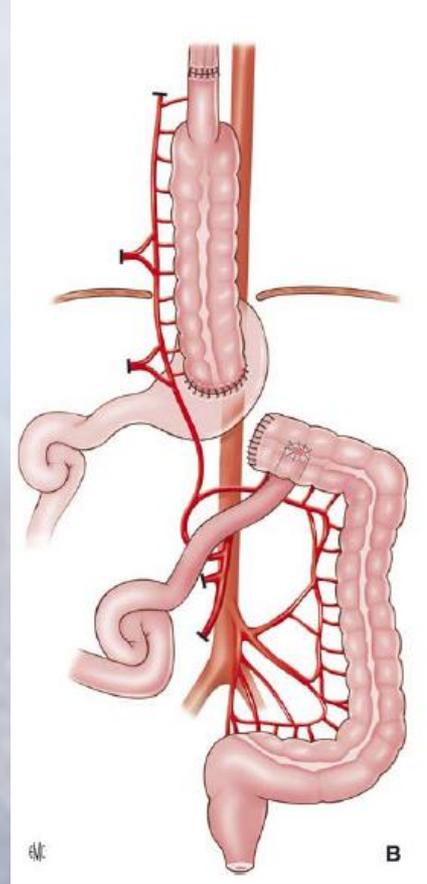


Nécrose caustique

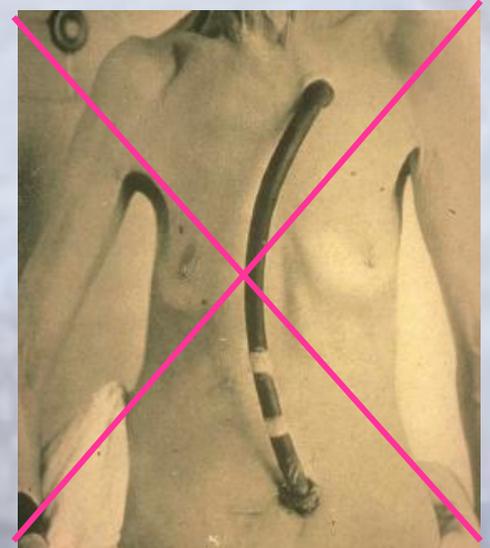
Techniques actuelles de reconstruction œsophagienne



gastroplastie



coloplastie



Esophageal replacement by allogenic aorta in a porcine model

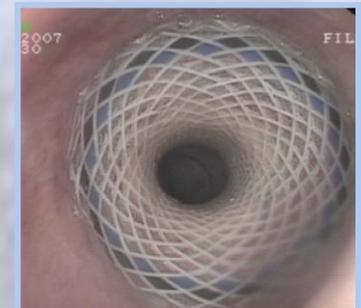
Sebastien Gaujoux, MD,^{a,f,g} Yann Le Balleur, MD,^{h,i} Patrick Bruneval, MD,^{f,j,l} Jerome Larghero, MD, PhD,^{b,c,f} Séverine Lecourt,^b Thomas Domet,^b Benoit Lambert, MD,^a Sarah Zohar, PhD,^{d,e} Frederic Prat, MD, PhD,^{h,i} and Pierre Cattan, MD, PhD,^{a,g,k} Paris, France



18 porcs mini-pigs
Suivi max. 12 mois
Remplacement de 4 cm d'œsophage cervical

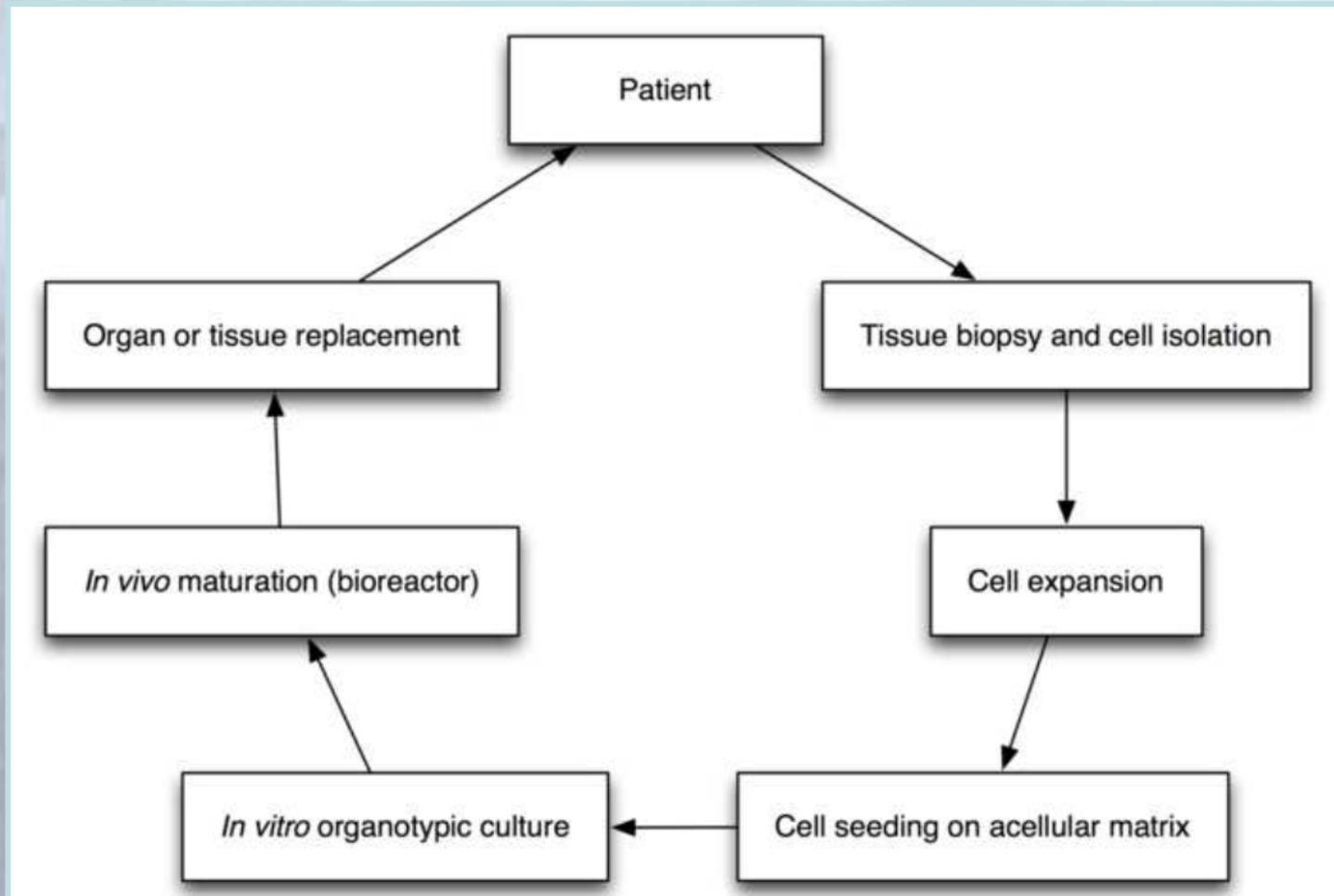
Analyses séquentielles (3-6-9-12 mois)

- Survie
- Complications
- Fonction
- Anatomopathologie



Bioartificial Oesophagus in the Era of Tissue Engineering

**Tigran Poghosyan, *Sebastien Gaujoux, ‡Rony Sfeir, †Jerome Larghero, and *Pierre Cattan*



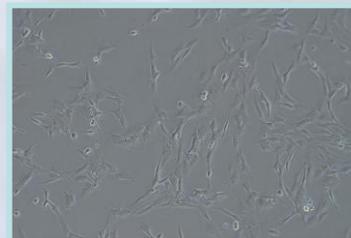
Protocole expérimental - approche hybride

1 Prélèvements

Cellules épithéliales

Cellules musculaires

Mini-pig



Expansions
cellulaires

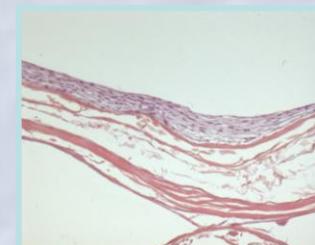
2

3

Ensemencement des matrices



MAH



SIS

5 Auto-transplantation

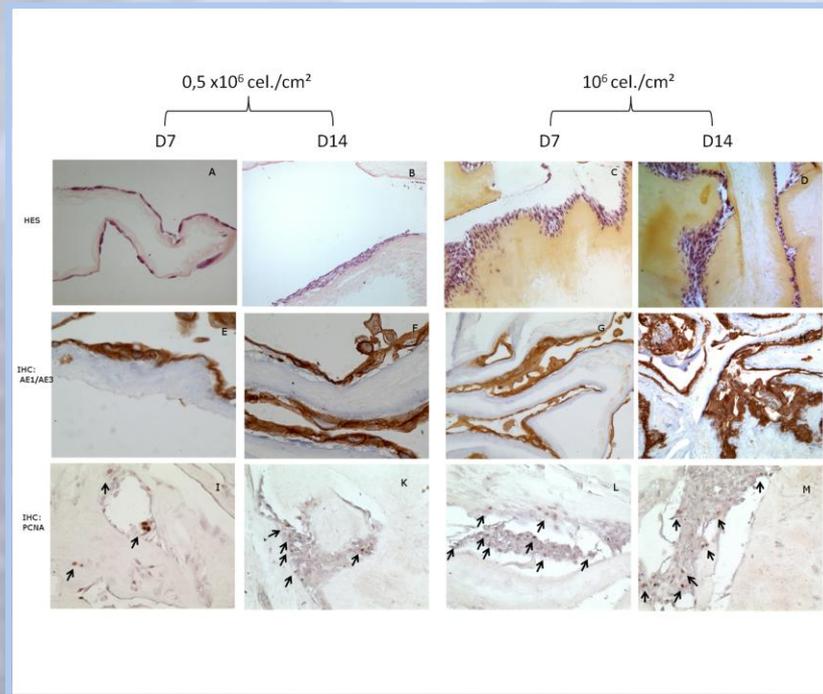
Assemblage et maturation
dans un bioréacteur

4



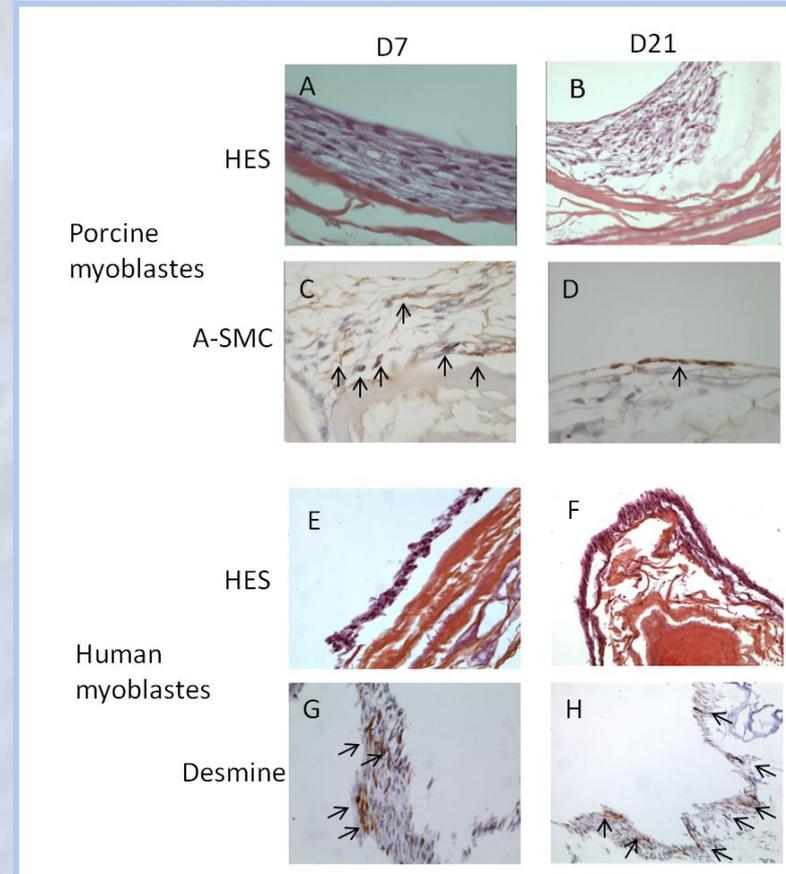
In Vitro Development and Characterization of a Tissue-Engineered Conduit Resembling Esophageal Wall Using Human and Pig Skeletal Myoblast, Oral Epithelial Cells, and Biologic Scaffolds

Tigran Poghosyan, MD, PhD,¹⁻³ Sebastien Gaujoux, MD, PhD,^{1,2} Valerie Vanneaux, Pharm D, PhD,^{1,3} Patrick Bruneval, MD, PhD,⁴ Thomas Domet, MSc,^{1,3} Severine Lecourt, PhD,^{1,3} Mohamed Jarraya, MD,⁵ Rony Sfeir, MD,⁶ Jerome Larghero, Pharm D, PhD,^{1,3} and Pierre Cattan, MD, PhD¹⁻³



MAH – Cellules épithéliales

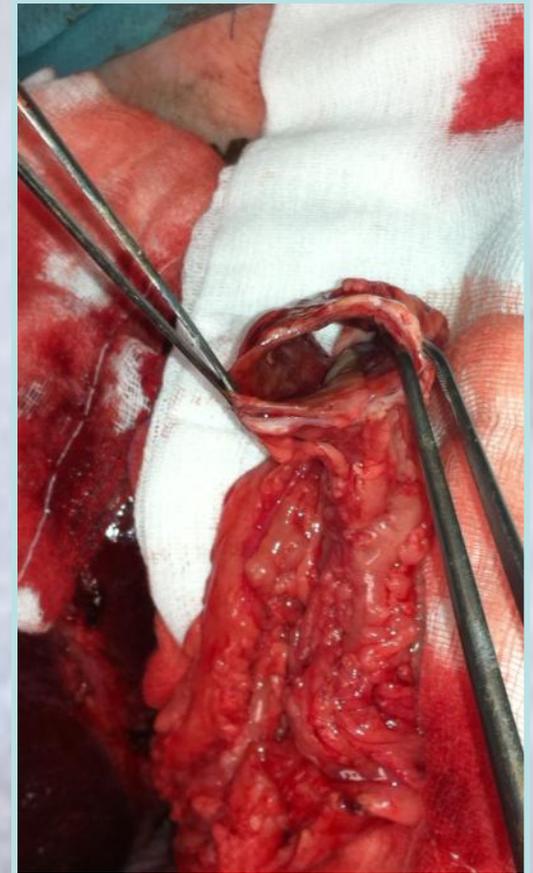
Analyse structurale et phénotypique après ensemencement



SIS – myoblastes

Analyse structurale et phénotypique après ensemencement

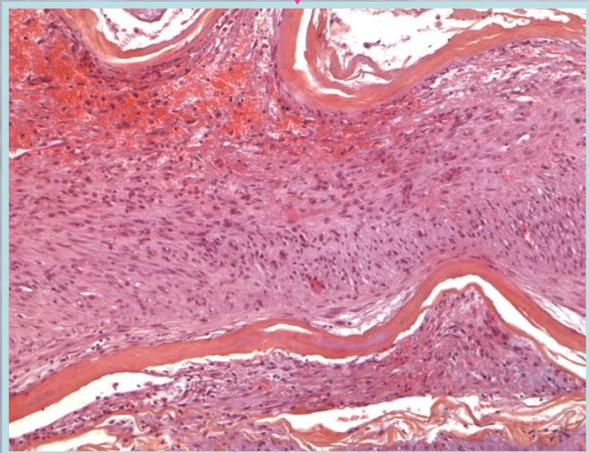
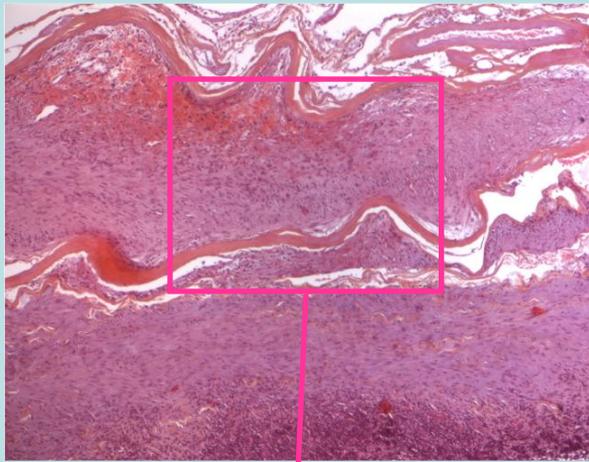
Positionnement du substitut dans le grand épiploon en vue de sa maturation (14 jours)



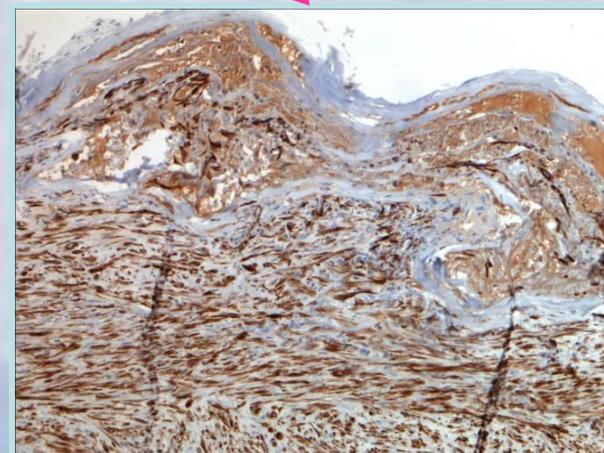
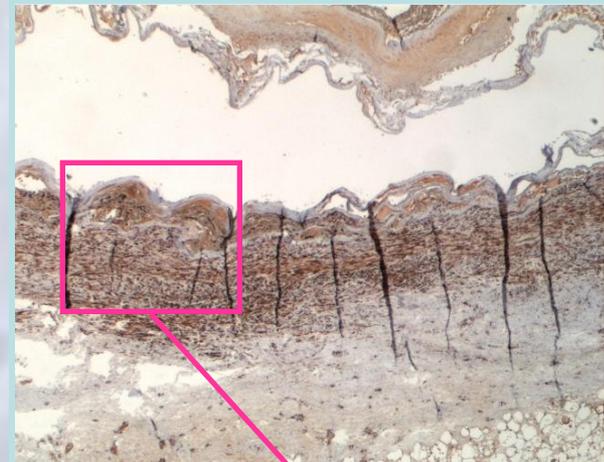
Après maturation dans le grand épiploon

Analyse histologique et immunohistochimique

HE

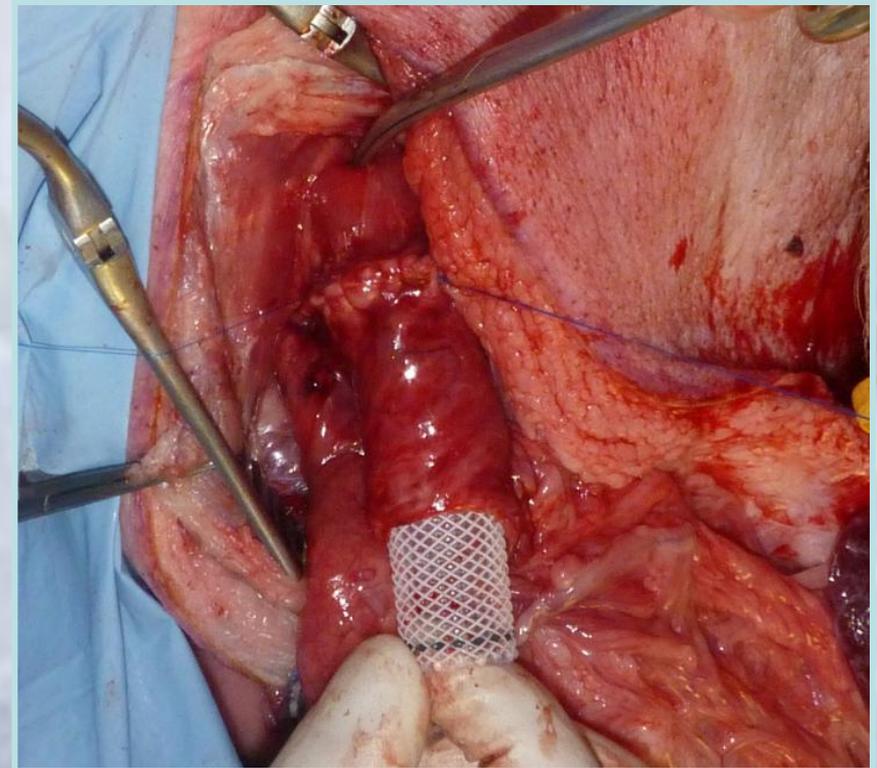


Desmine

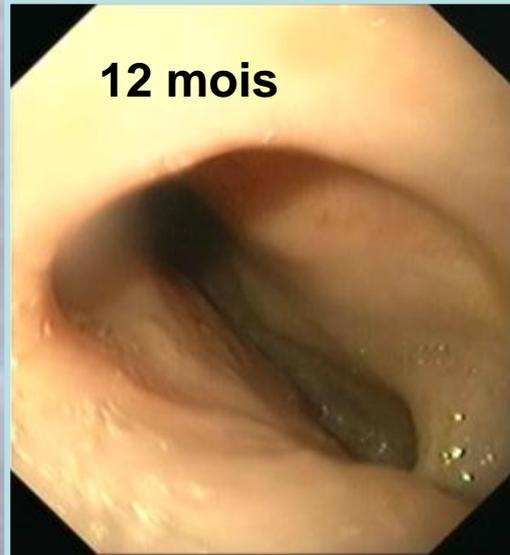
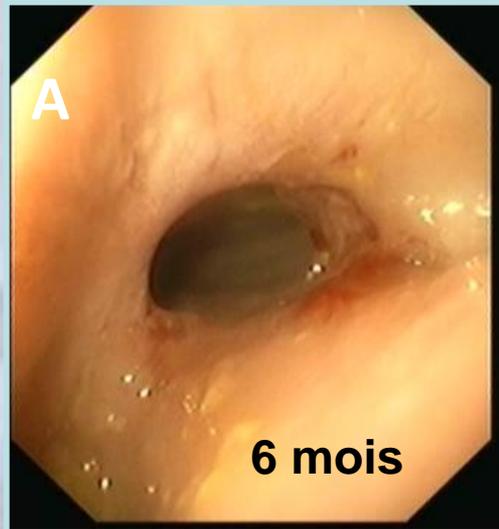


Remplacement circonférentiel de l'œsophage cervical

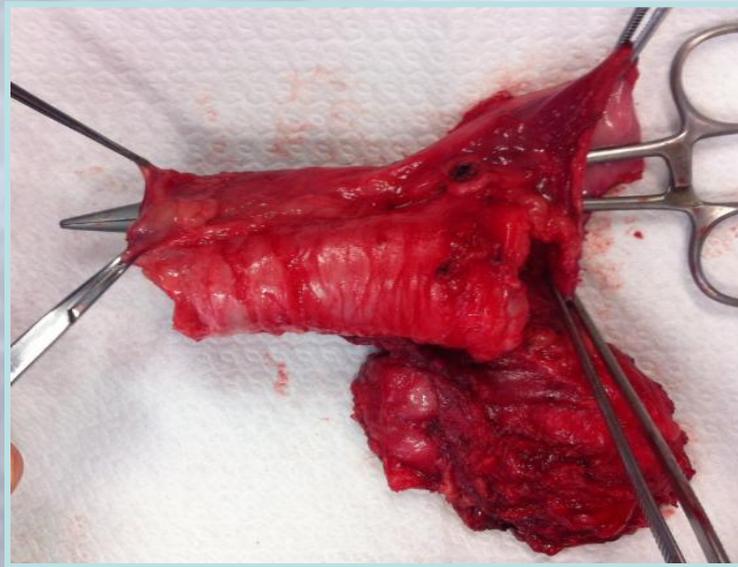
Vue per-opératoire



Explorations endoscopique et radiologique



Analyse macroscopique du substitut (12 mois)



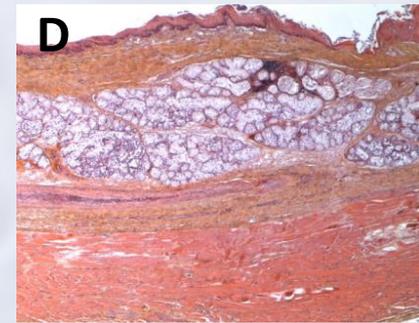
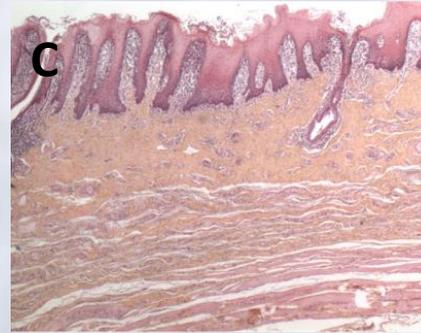
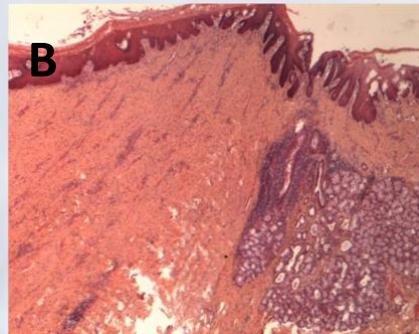
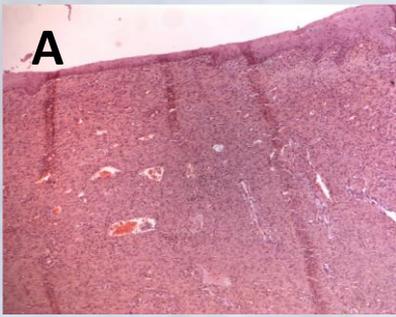
2 months

7 months

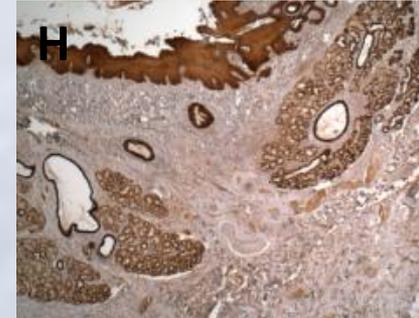
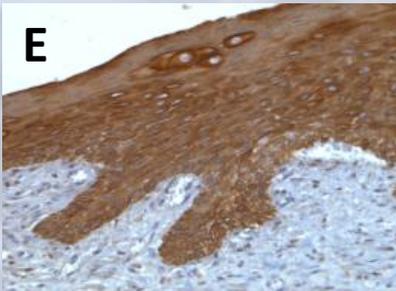
12 months

Native

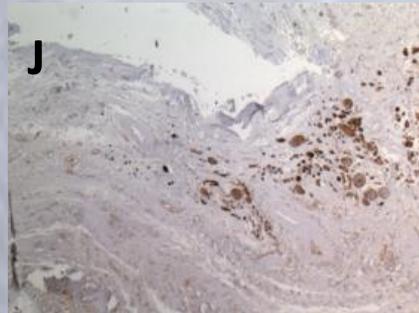
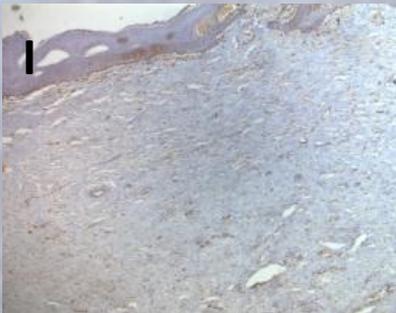
HES



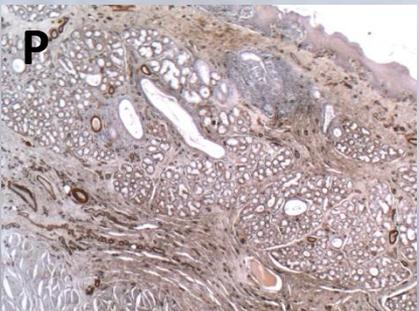
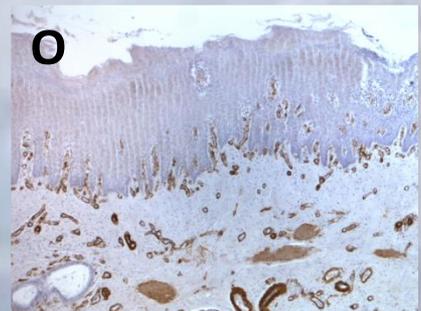
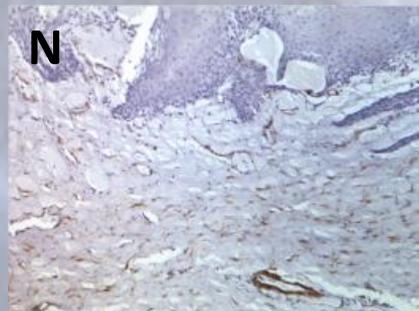
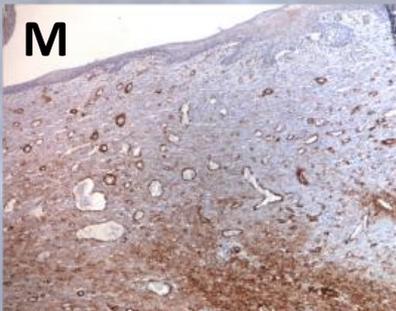
AE1/AE3



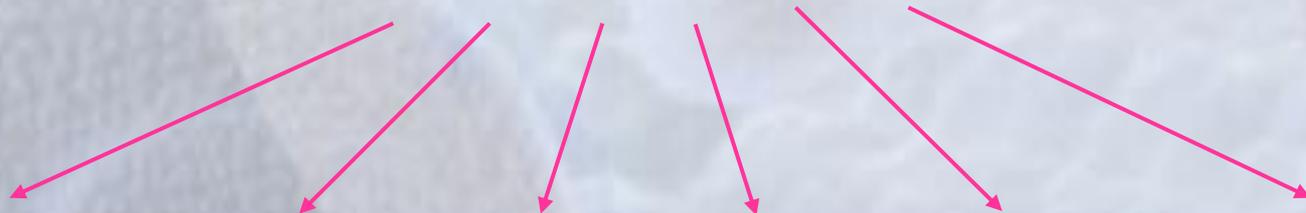
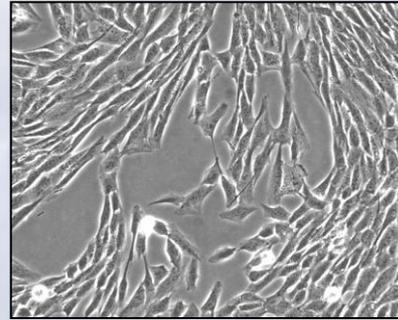
Desmine



SMA



Cellules souches mésenchymateuses (CSM)



Cartilage

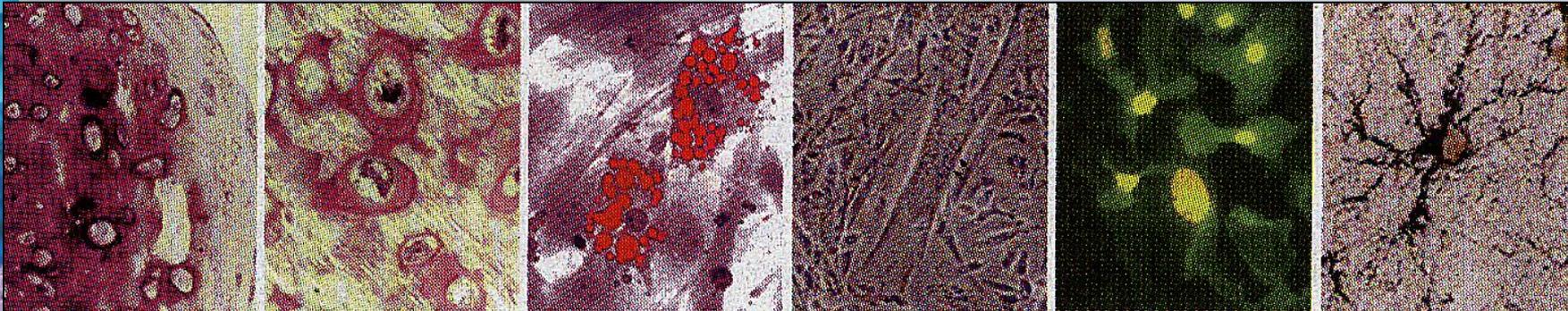
Os

Tissu adipeux

Muscle

Stroma

Astrocytes



Cellules souches adultes

Fonctions:

- donner naissance aux cellules matures d'un tissu donné (= homéostasie)
- réparer un tissu donné en cas de dommages

Auto-renouvellement
(= réservoir de cellules
Souches)

Division → Différenciation
(= acquisition des
caractéristiques du tissu
à réparer)

Cellules souches mésenchymateuses (CSM)

Synthèse de peptides, cytokines, chemokines

CSM



SDF-1, PDGF, FGF-2, IL-6, IL-7,
IL-8, IL-11, SCF, MCP-1, TGF β ,
M-CSF, GM-CSF

Hématopoïèse

Interactions
cellulaires

angiogénèse

Modulation de
la réponse
immunitaire