

JFN Bruxelles

11 Décembre 2014

Obésité/métabolisme du muscle et exercice : aspects mécanistiques

Cédric Moro

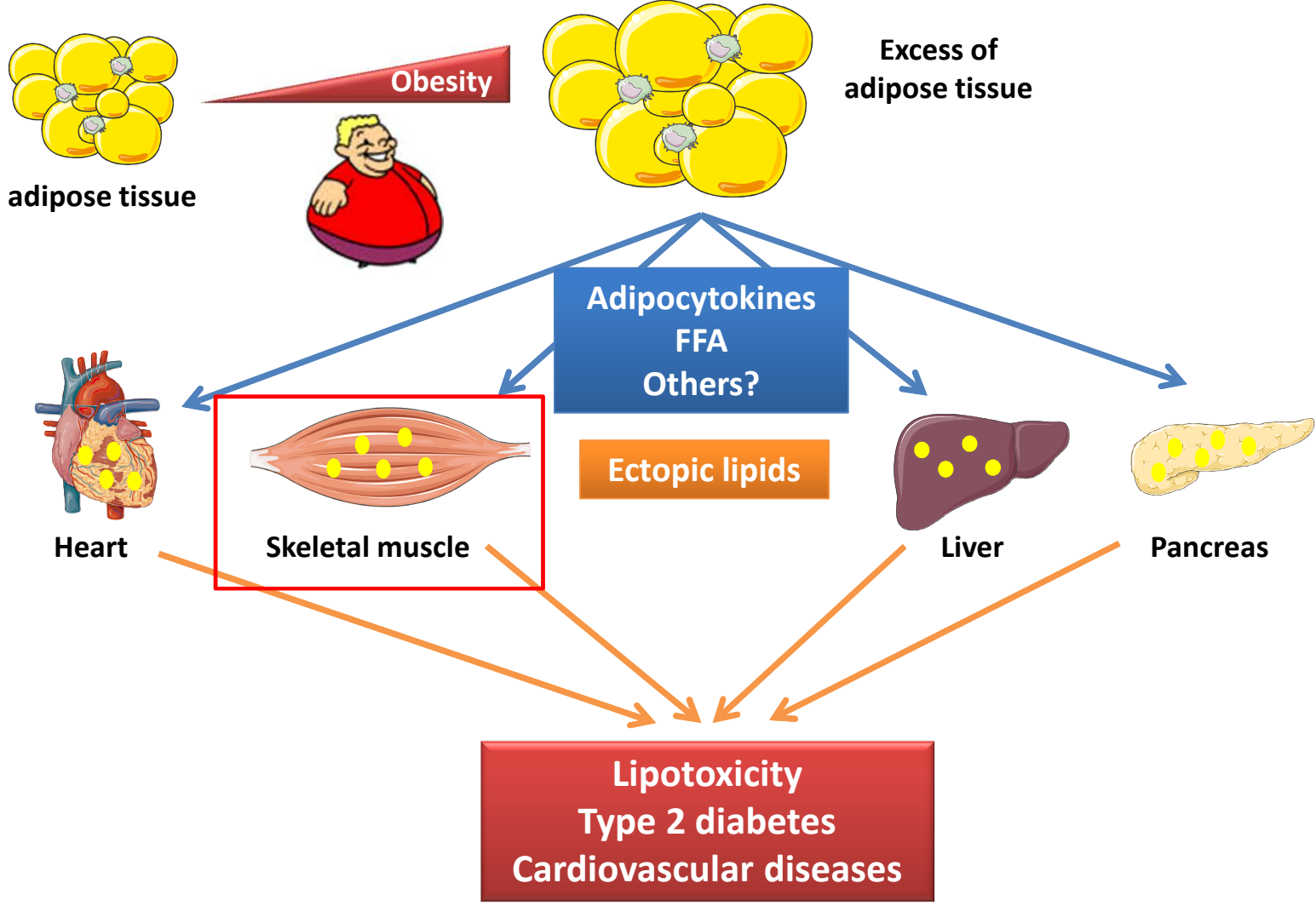
Institut des Maladies Métaboliques et Cardiovasculaires,

INSERM 1048, CHU Rangueil, Toulouse, France

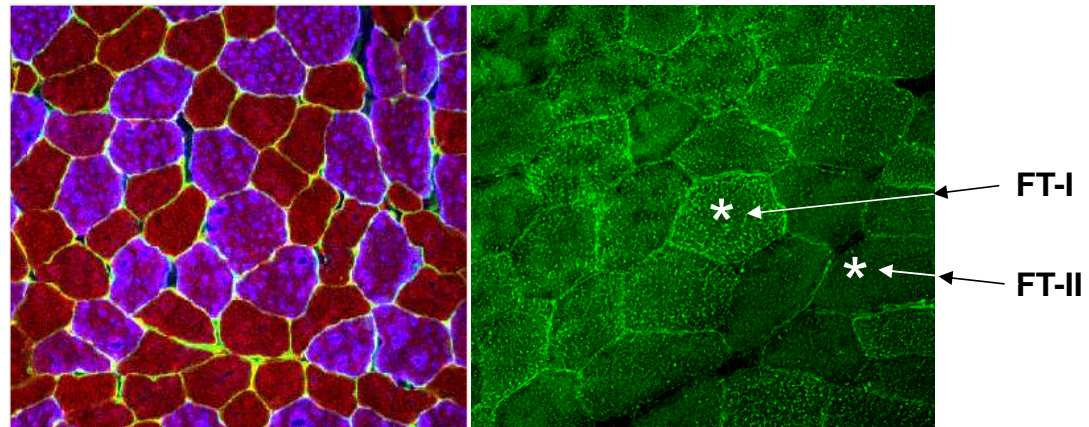
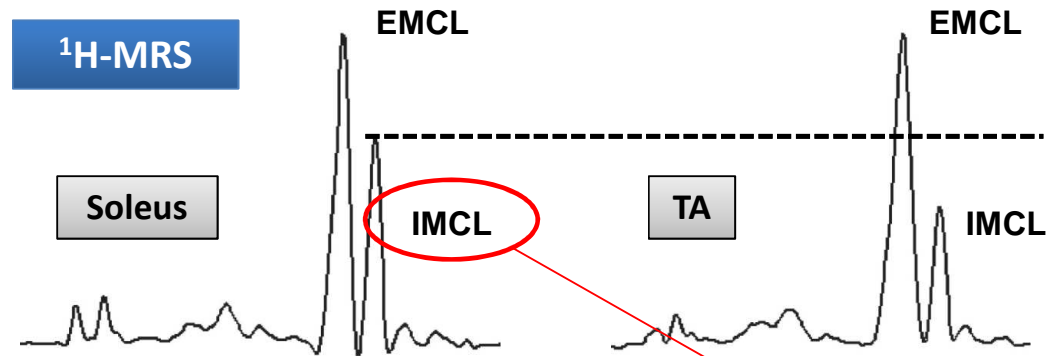
Cedric.Moro@inserm.fr

- Aucun conflit d'intérêt à déclarer

Une vision lipocentrique des complications de l'obésité

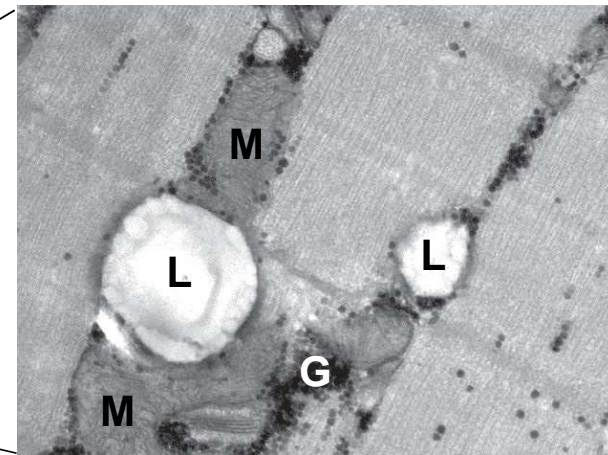
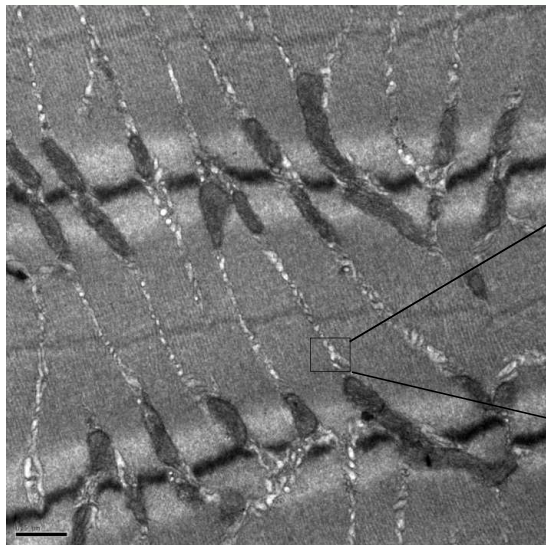
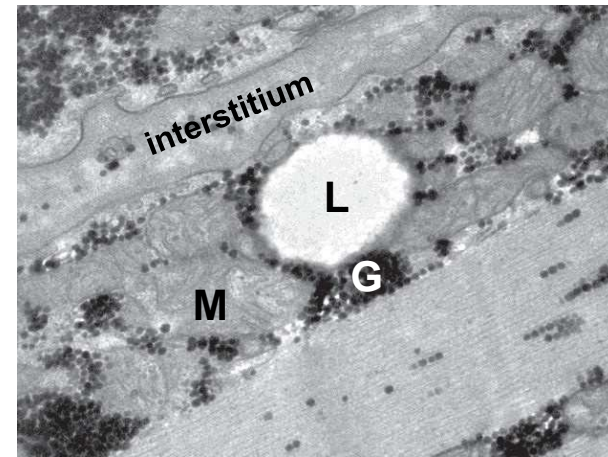
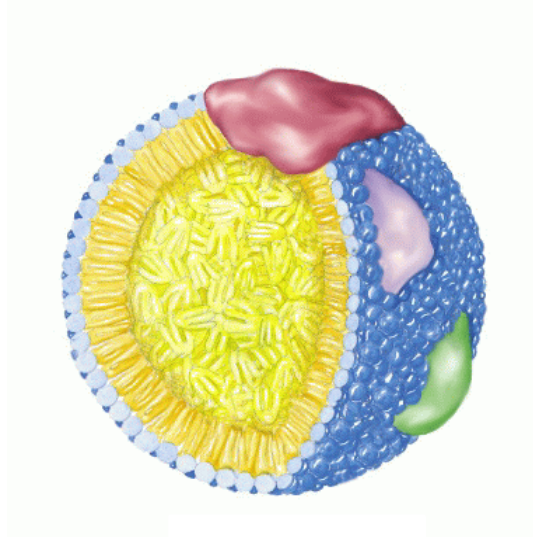


Les lipides ectopiques dans le muscle squelettique

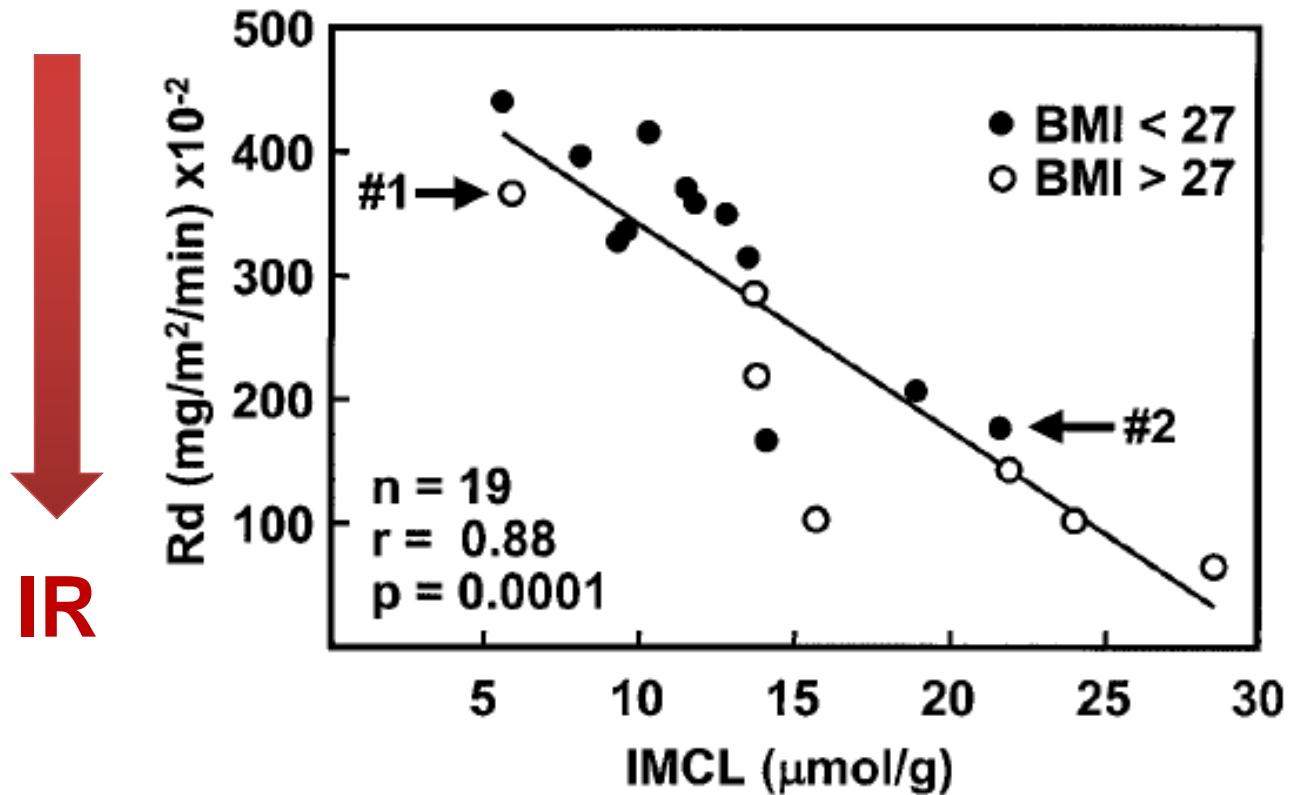


Bodipy staining

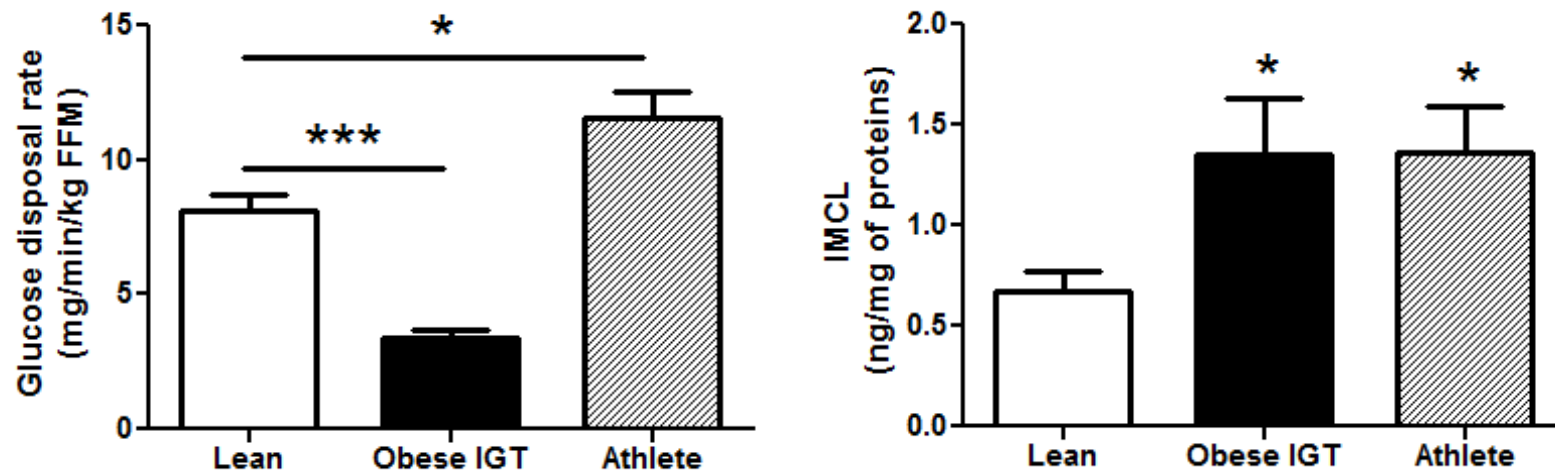
Structure et localisation des gouttelettes lipidiques



Les lipides intramyocellulaires sont inversement corrélés à la sensibilité à l'insuline chez l'homme



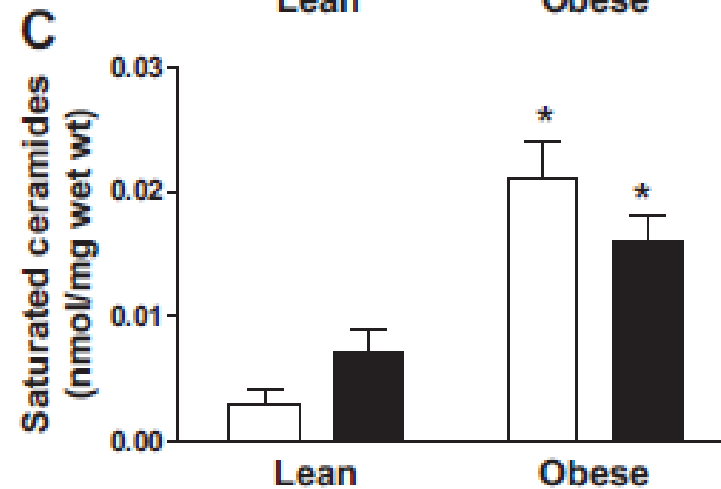
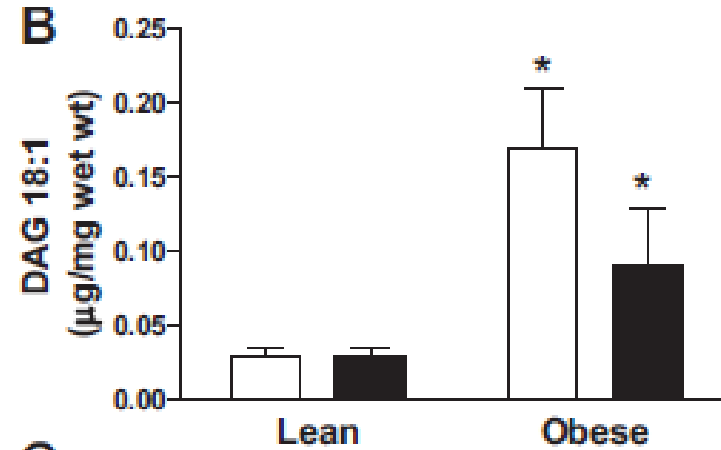
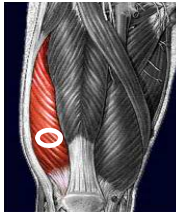
Lipides intramyocellulaires et sensibilité à l'insuline: Le paradoxe des athlètes



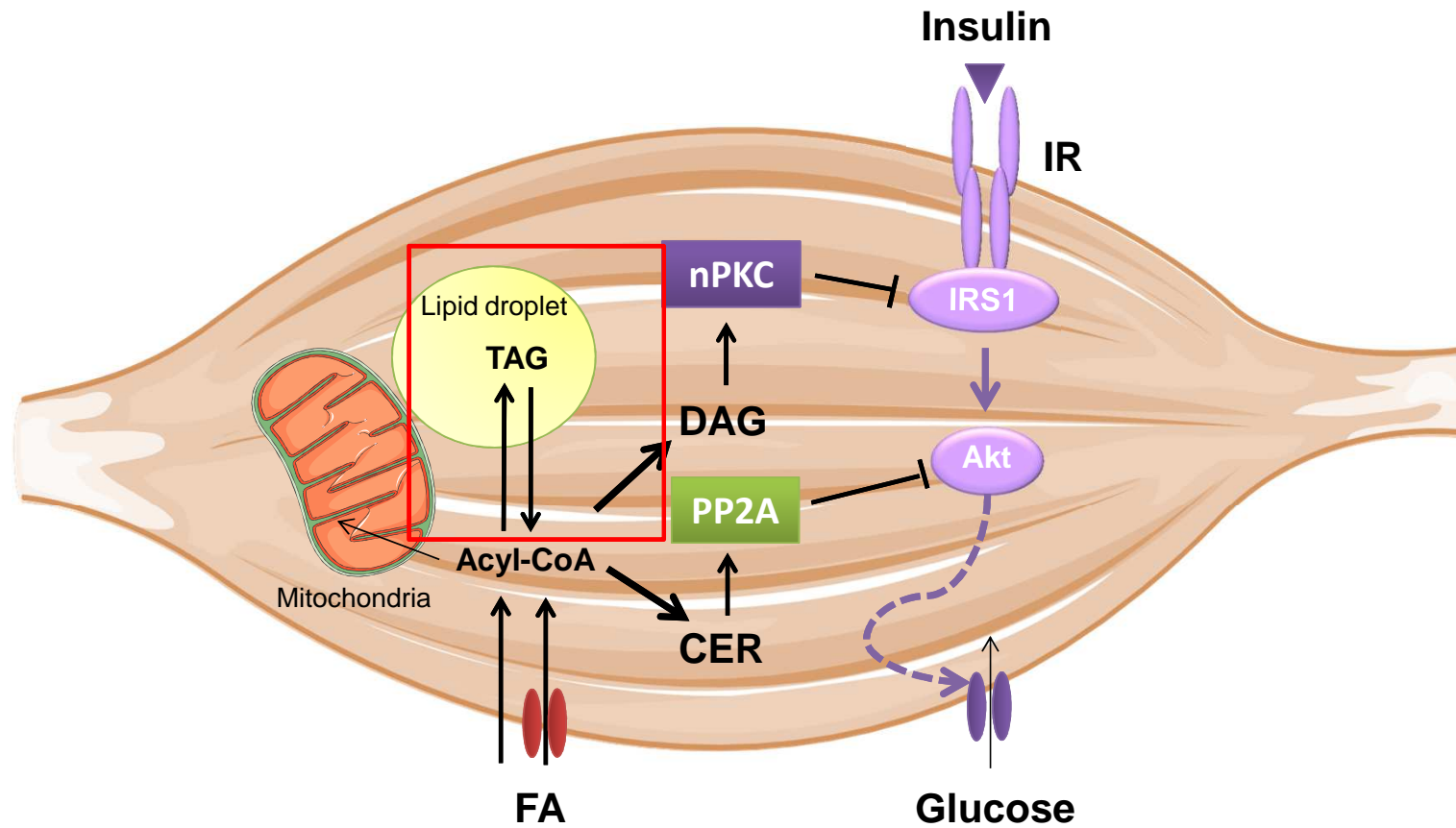
*p<0.05
***p<0.001

Unpublished data

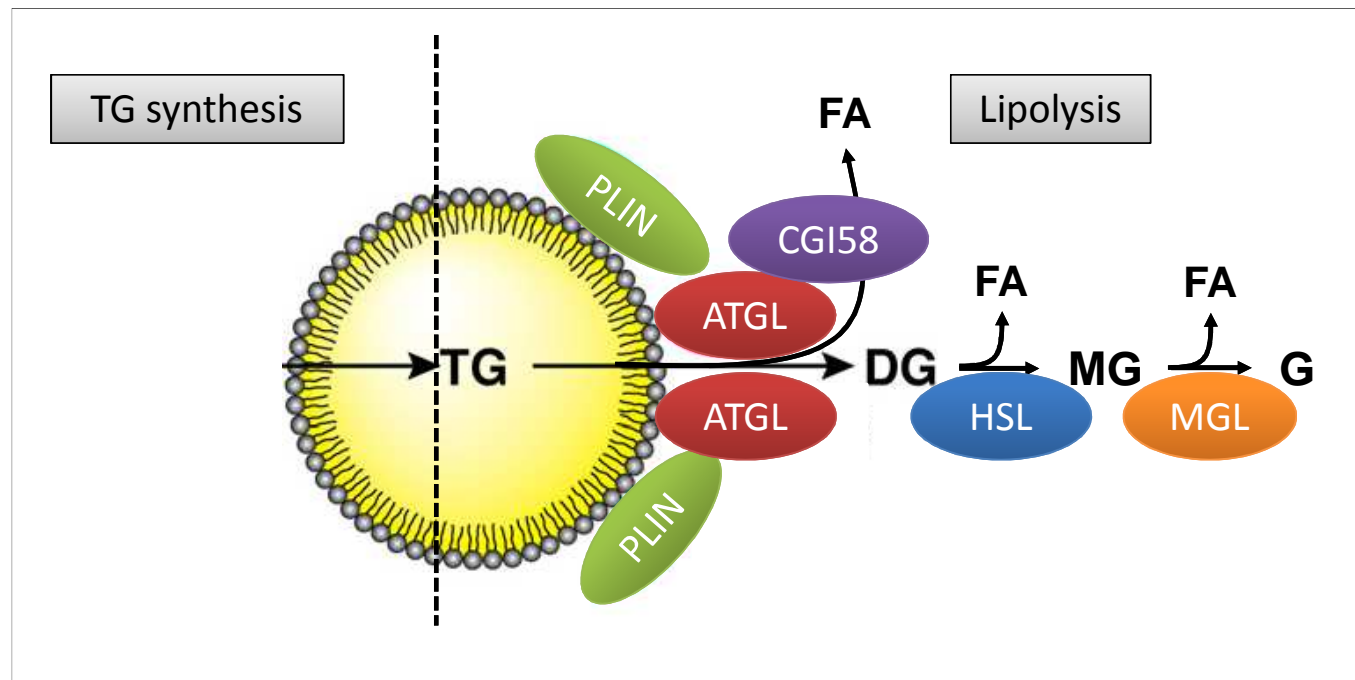
Augmentation des lipides toxiques dans le muscle de sujets obèses sédentaires



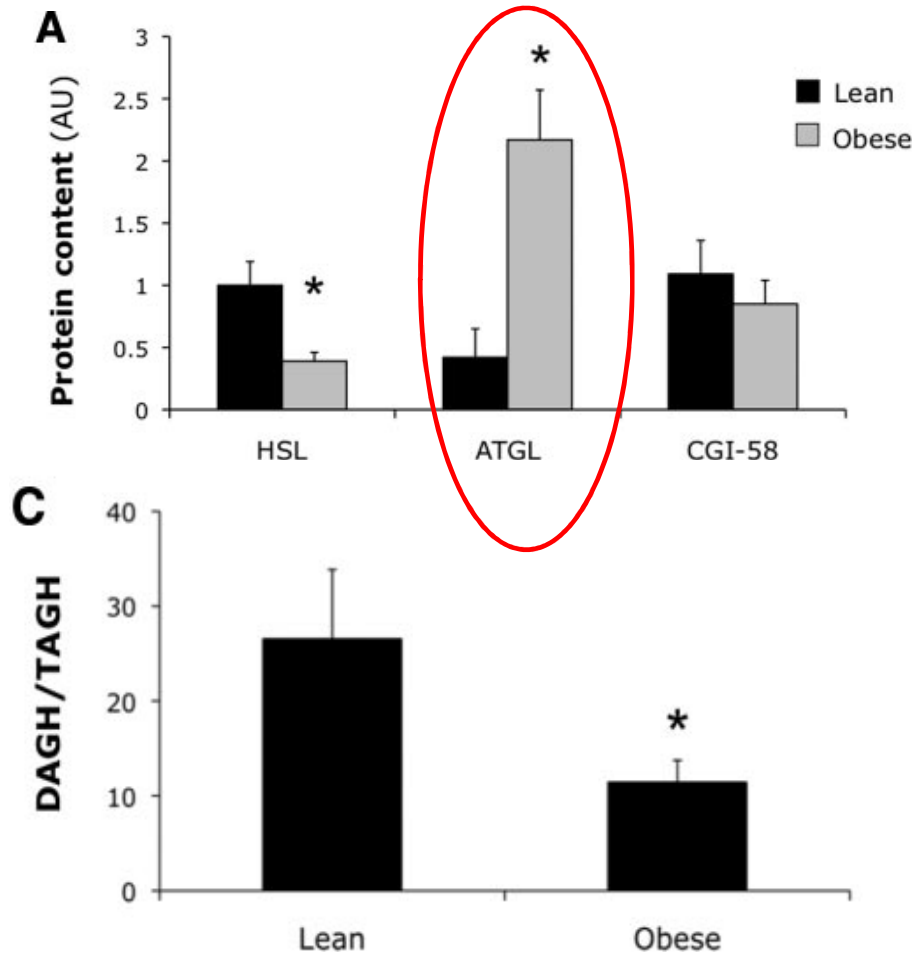
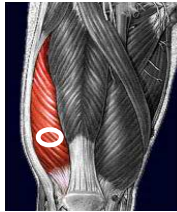
Mécanismes moléculaires de l'insulino-résistance induite par les lipides dans le muscle



Mécanismes moléculaires d'activation de la lipolyse dans le muscle squelettique

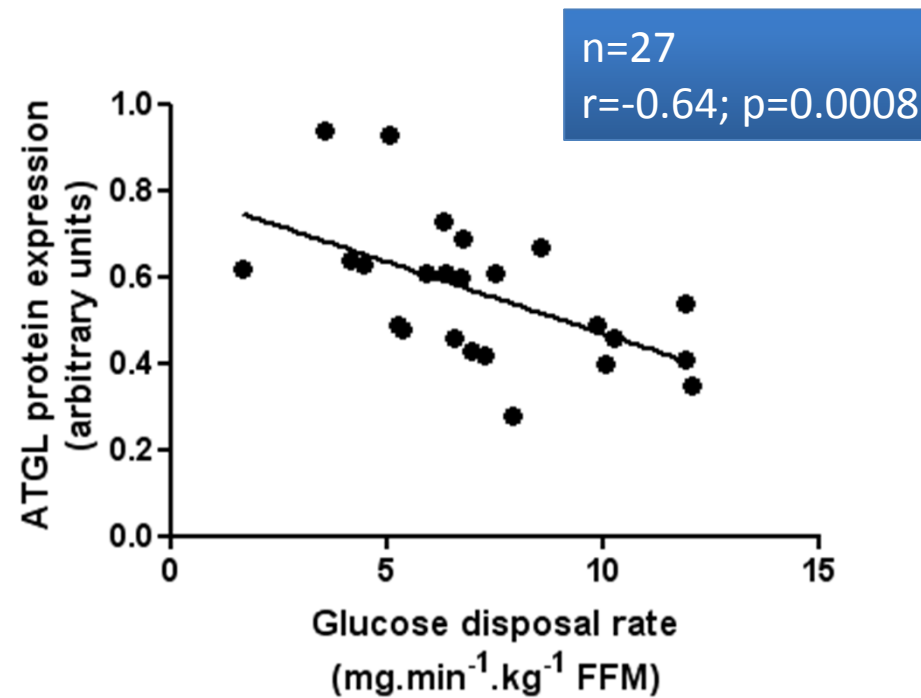


Dérégulation de l'expression musculaire des lipases dans le muscle squelettique de sujets obèses

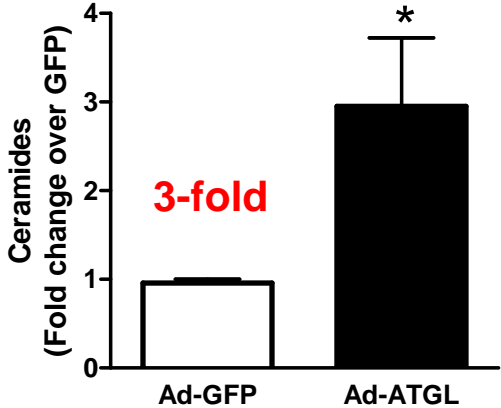
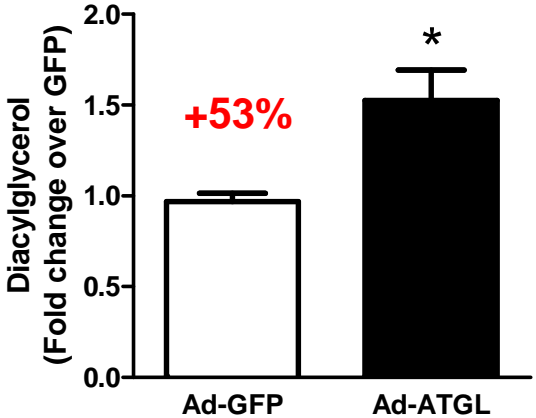
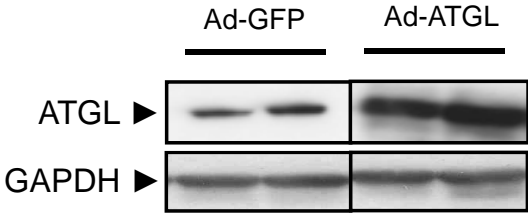
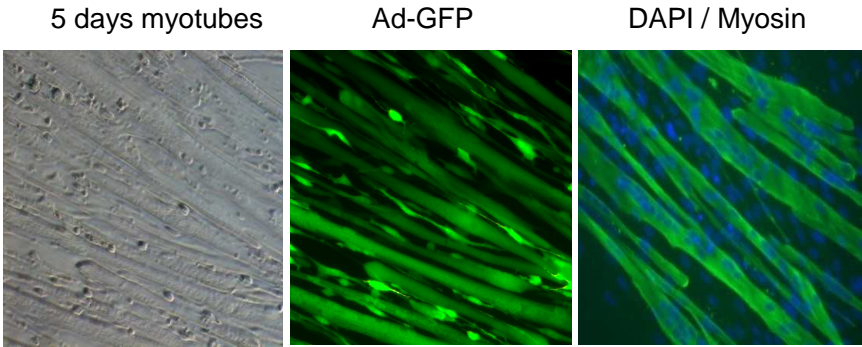


* $p < 0.05$ vs. Lean

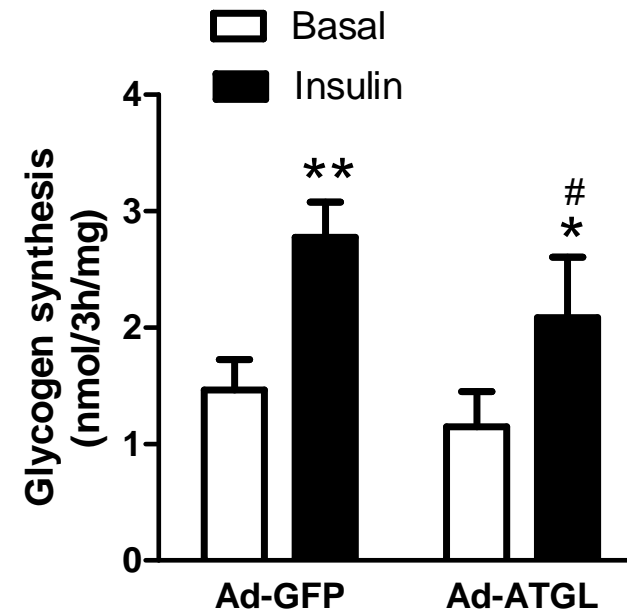
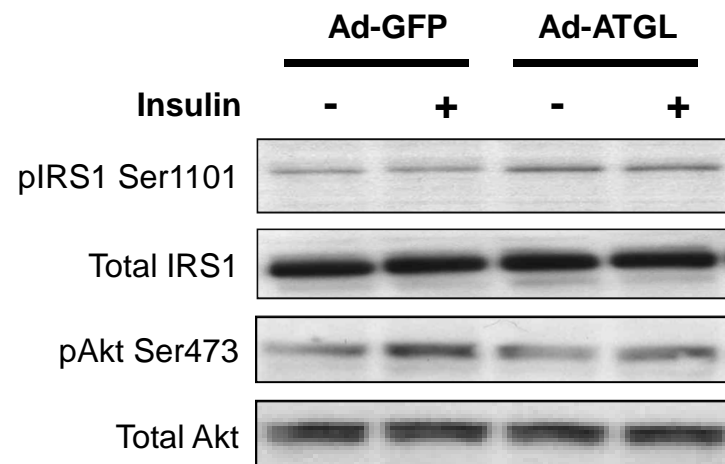
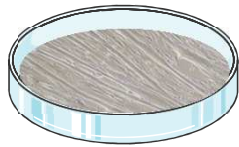
Corrélation inverse entre expression musculaire de l'ATGL et sensibilité à l'insuline chez l'homme



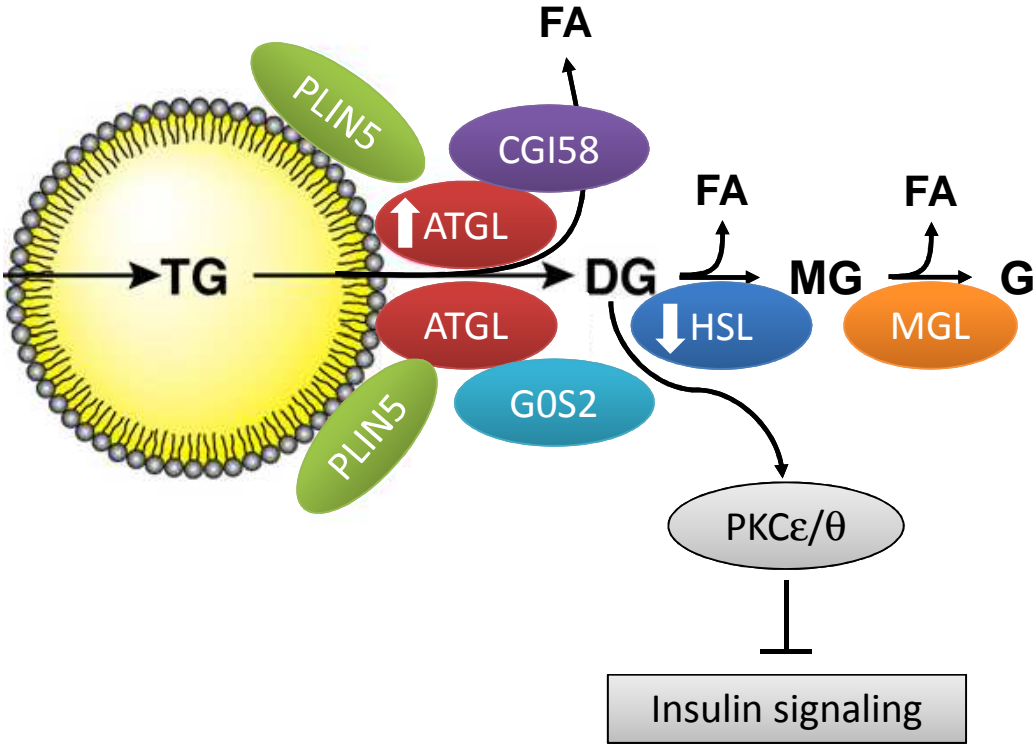
Une surexpression de l'ATGL induit une lipotoxicité dans des cellules musculaires humaines



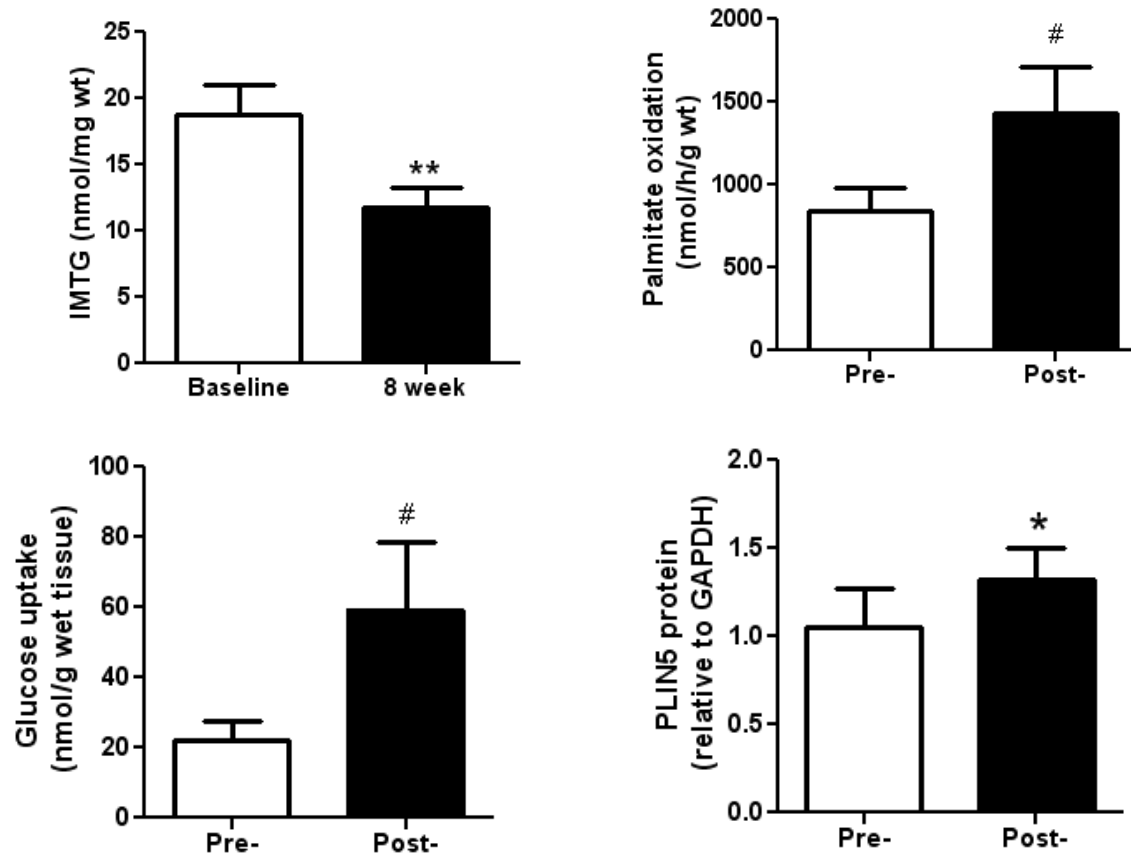
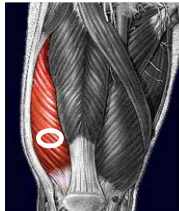
Une surexpression de l'ATGL inhibe la signalisation insulinique dans des cellules musculaires humaines



Une dérégulation de la lipolyse musculaire induit une insulino-résistance dans le muscle squelettique

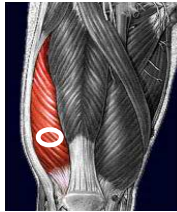


L'entraînement en endurance diminue la lipotoxicité musculaire chez des sujets obèses

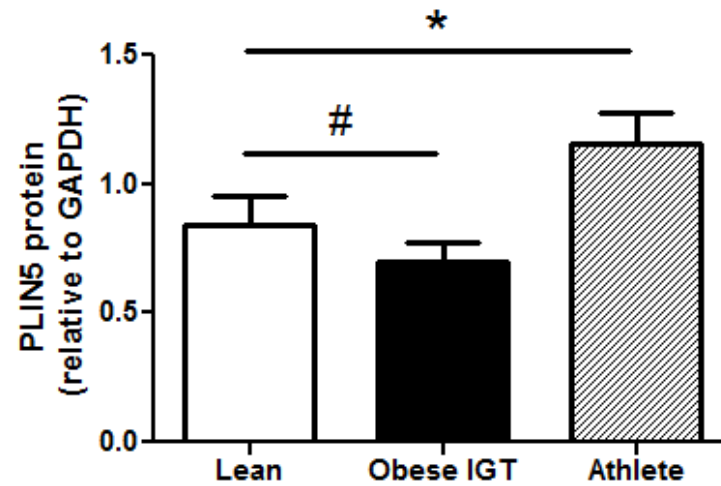
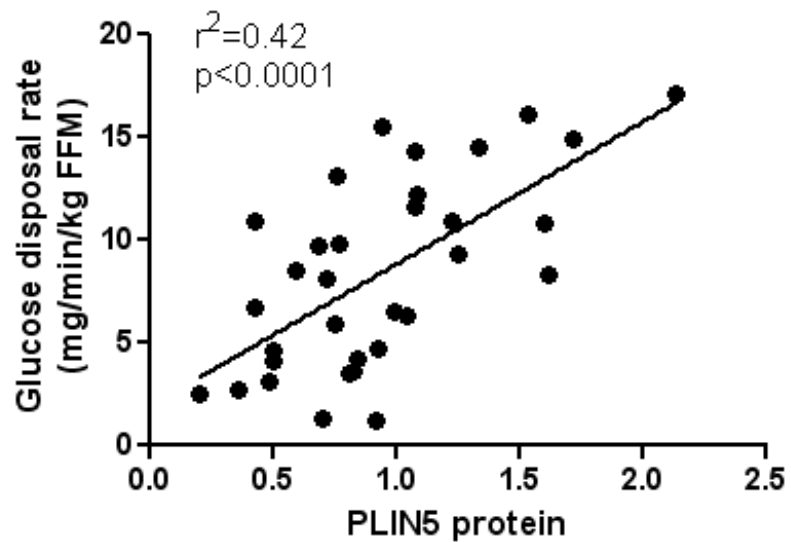


**p<0.01
#p=0.06

Le contenu musculaire en périlipine 5 est un déterminant de la sensibilité à l'insuline

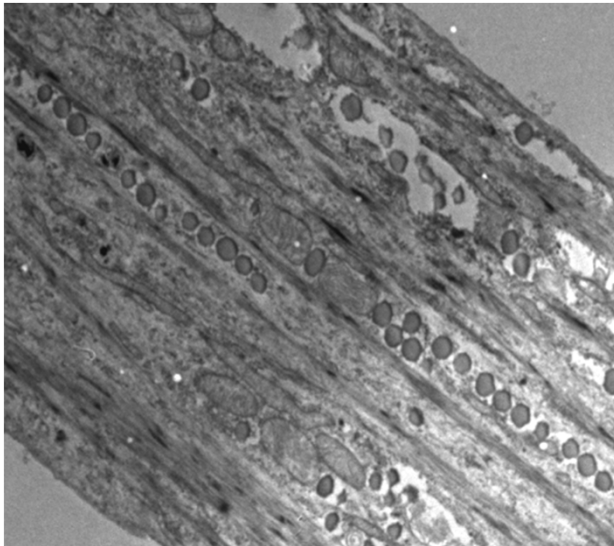
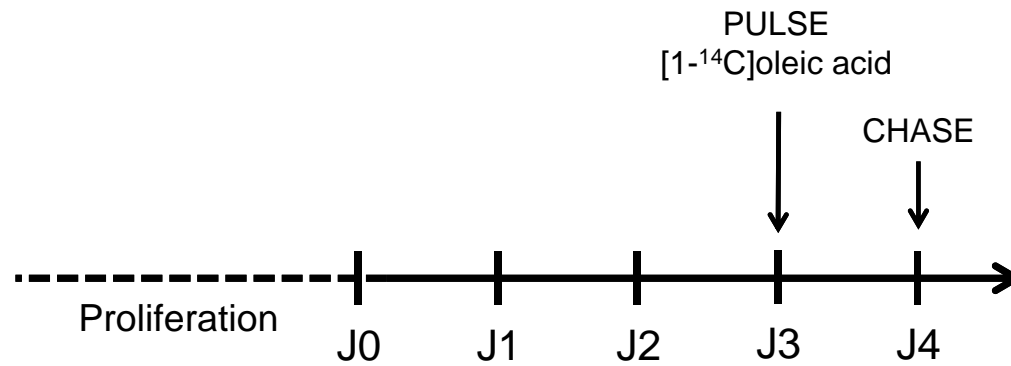
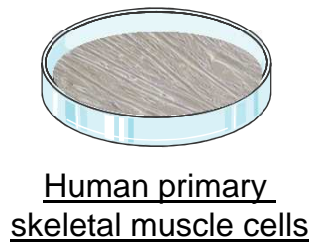


Cohort of 33 sedentary and physically active subjects

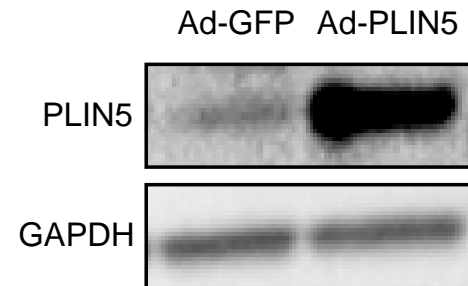


Unpublished data

Surexpression de PLIN5 *in vitro* dans des cellules musculaires humaines

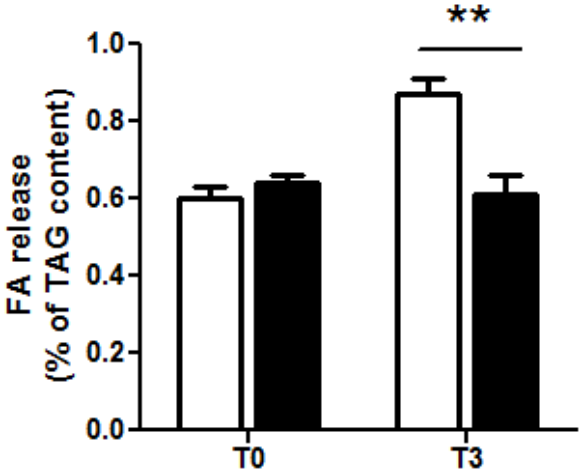
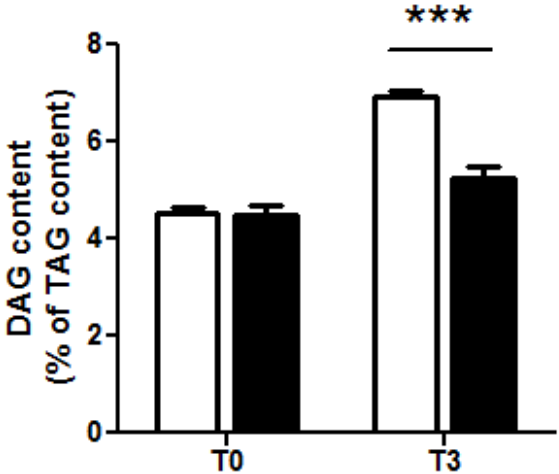
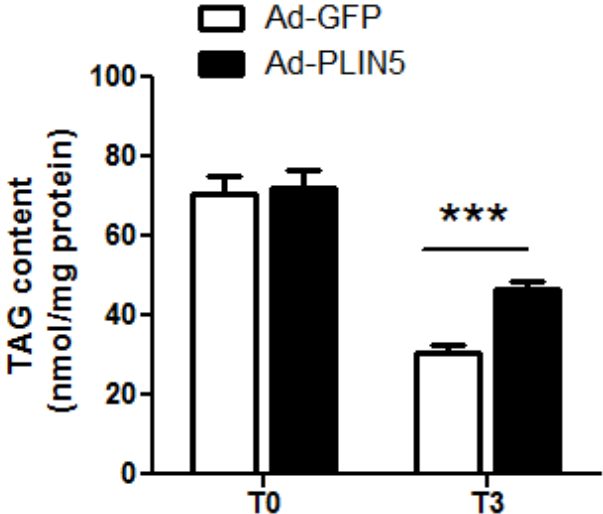
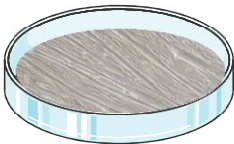


Ad-GFP
or
Ad-PLIN5



Unpublished data

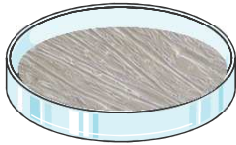
PLIN5 inhibe la lipolyse basale dans le muscle



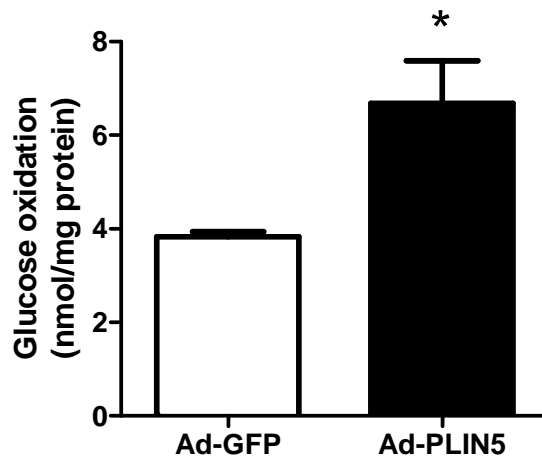
**p<0.01
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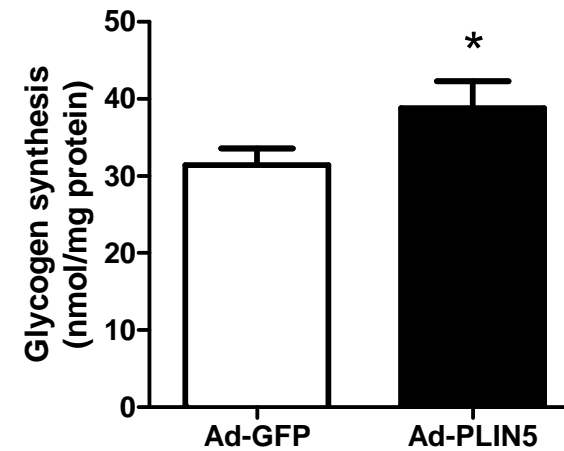
Augmentation de l'utilisation du glucose en réponse à la surexpression de PLIN5 dans le muscle



Glucose oxidation



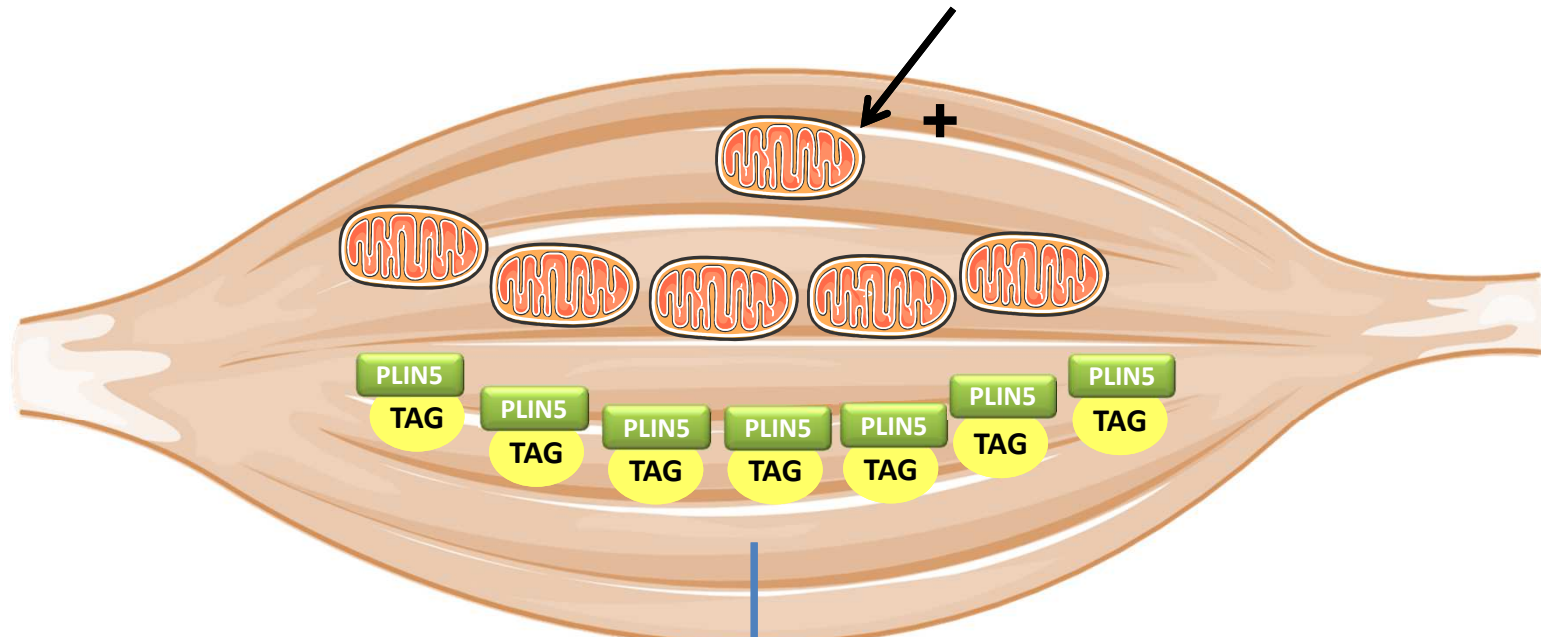
Glycogen synthesis



Unpublished data

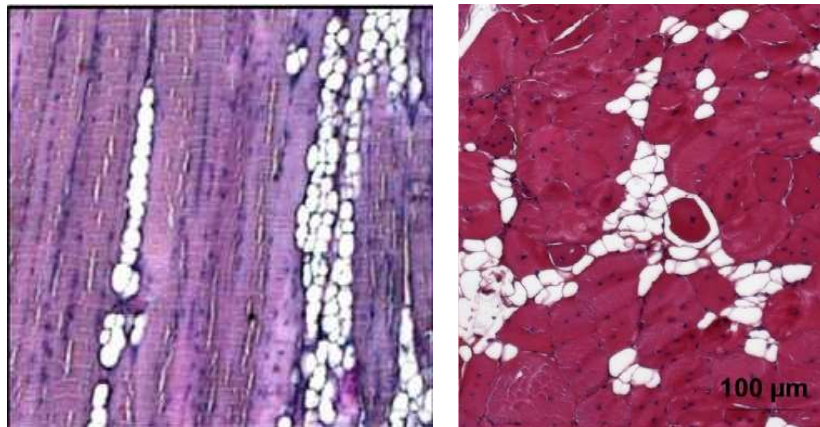
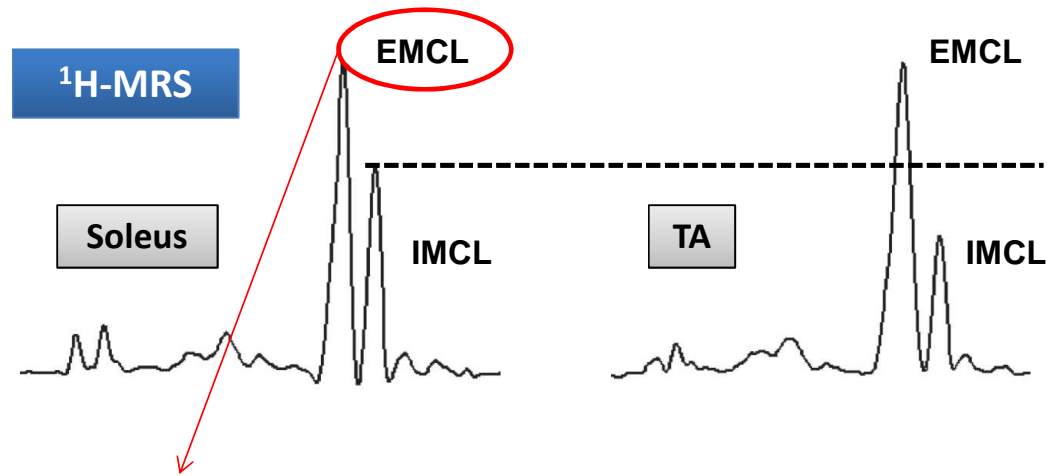
Conclusion

Exercise



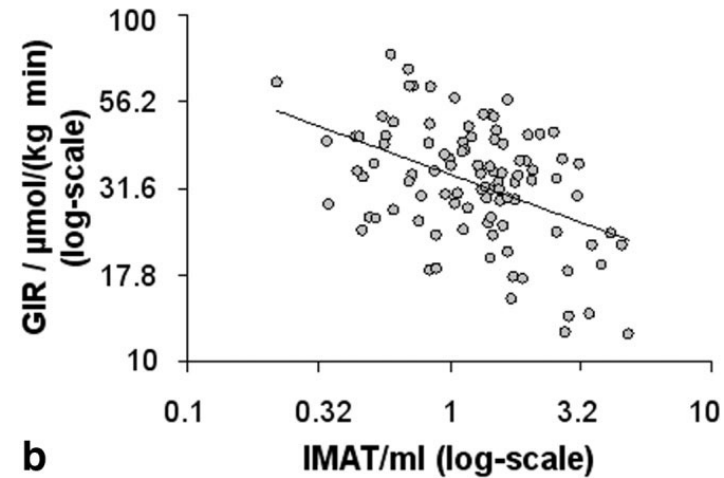
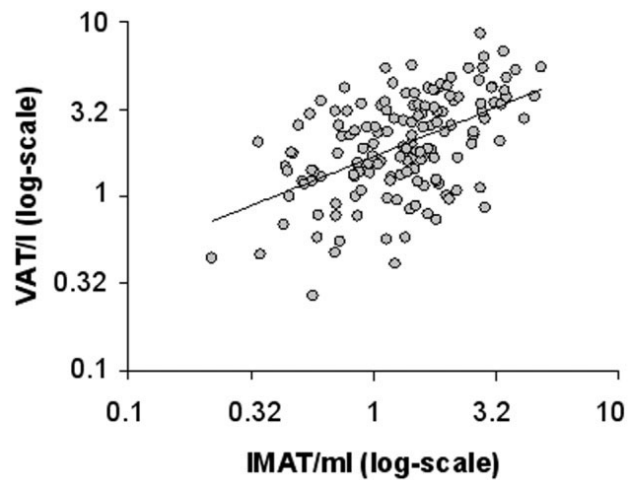
↑ Fat oxidation
↓ Lipotoxicity
↑ Insulin sensitivity

Les lipides ectopiques dans le muscle squelettique



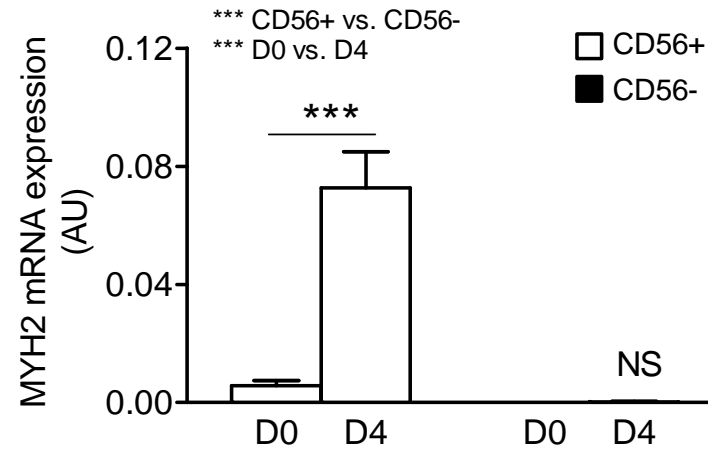
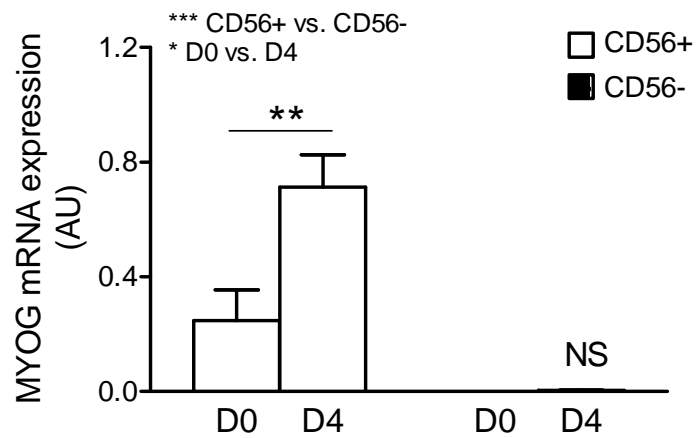
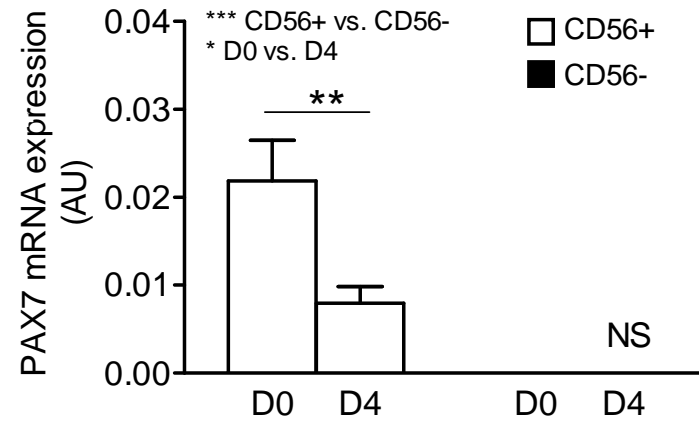
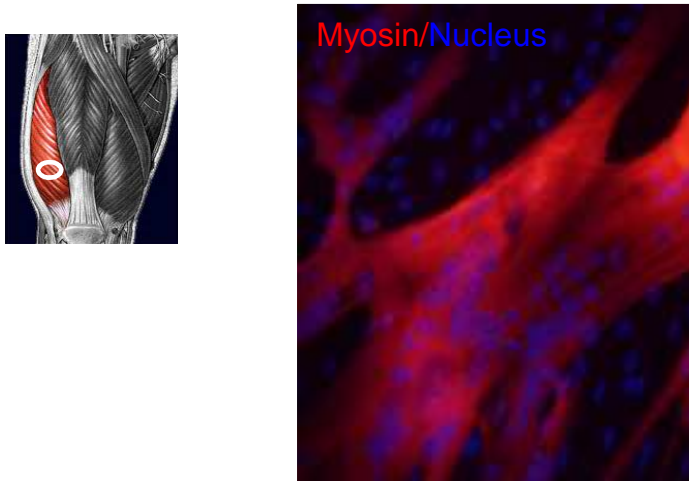
Hematoxylin – eosin – safranin

Le tissu adipeux intermusculaire corrèle négativement avec la sensibilité à l'insuline chez l'homme



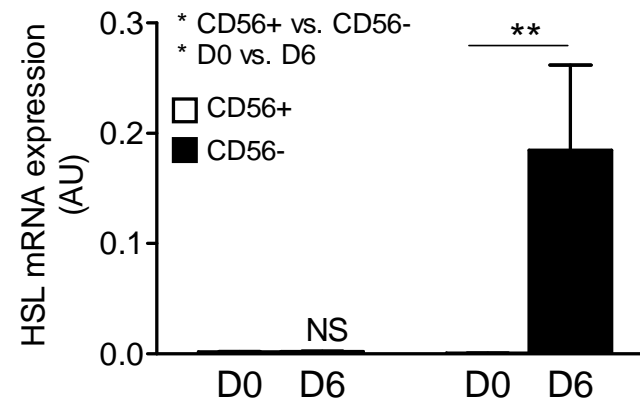
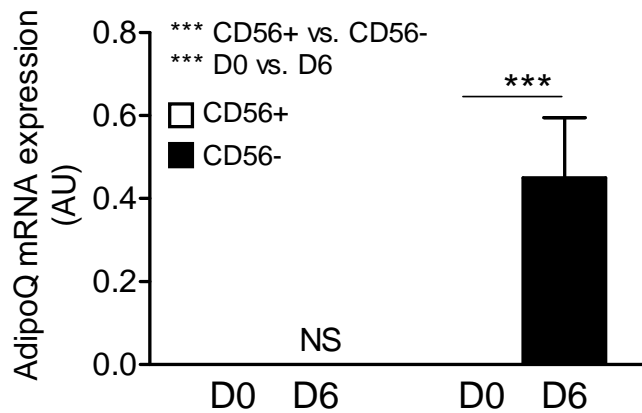
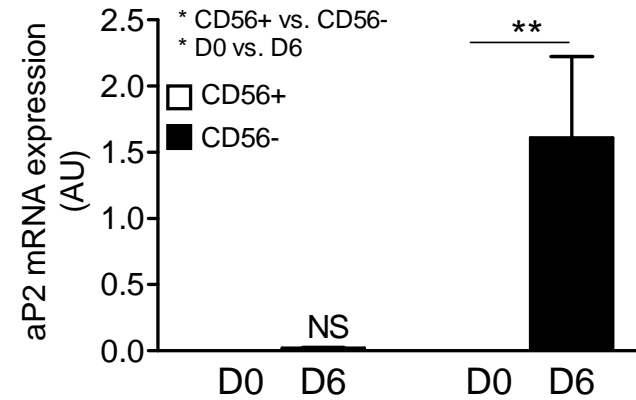
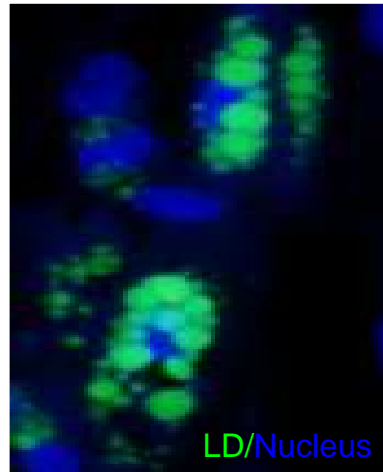
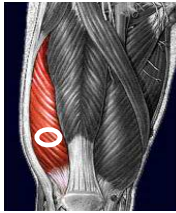
IMAT = intramuscular adipose tissue

Cellules CD56+ et CD56- en milieux myogénique



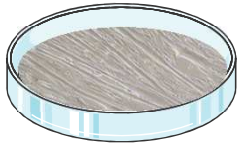
Unpublished data

Cellules CD56+ et CD56- en milieu adipogénique

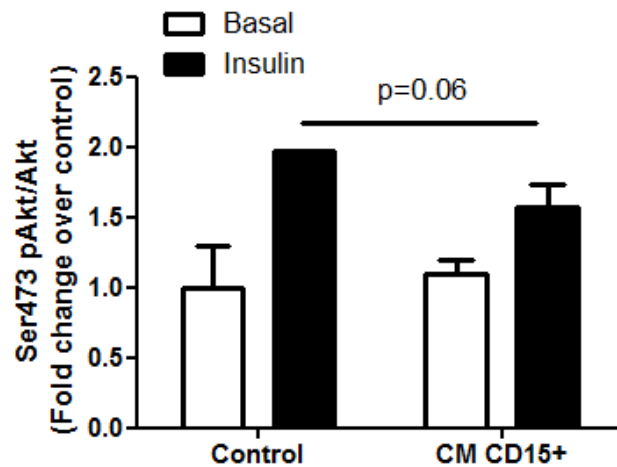


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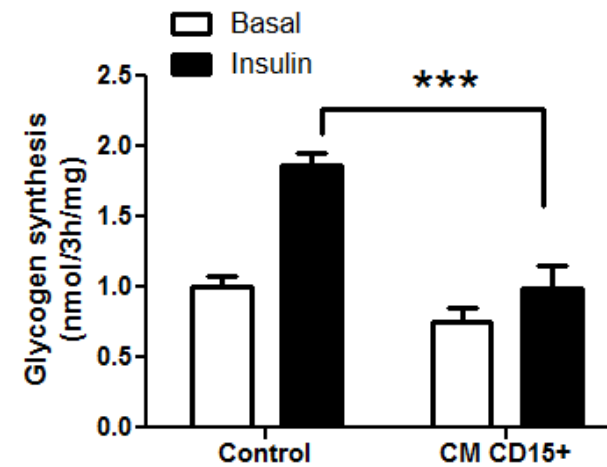
Les adipocytes intermusculaires inhibent l'action de l'insuline dans des cellules musculaires humaines



Insulin signaling

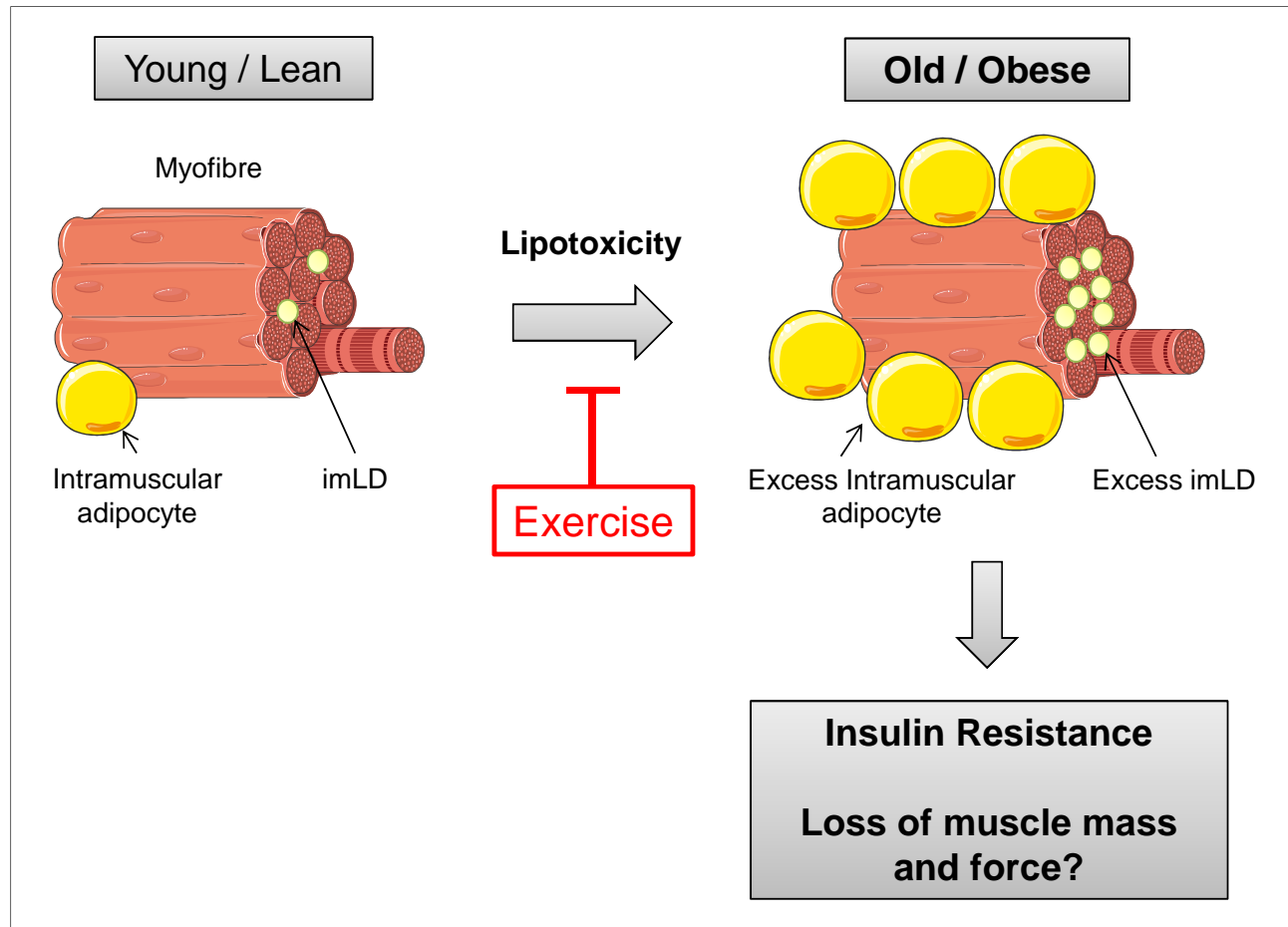


Glycogen synthesis



Unpublished data

Conclusion



Remerciements

Obesity Research Laboratory

Dominique Langin (Director)
Virginie Bourlier (Associate Professor)
Katie Louche (Research Associate)
Claire Laurens (PhD Student)
Marine Coué (PhD Student)
Students (Montech)

Pierre-Marie Badin
Isabelle Vila
Geneviève Tavernier
François Crampes
Isabelle de Glisezinski
Dominique Larrouy
Isabelle Harant
Nathalie Viguerie
Claire Thalamas
Max Lafontan

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Jose E. Galgani (Santiago de Chile)
Denis R. Joannis (Quebec)
Andre Marette (Quebec)

Lipidomic Core, MetaToul

Justine Bertrand-Michel
Aude Dupuy



EFSD

European Foundation for the Study of Diabetes