

## Basic Science

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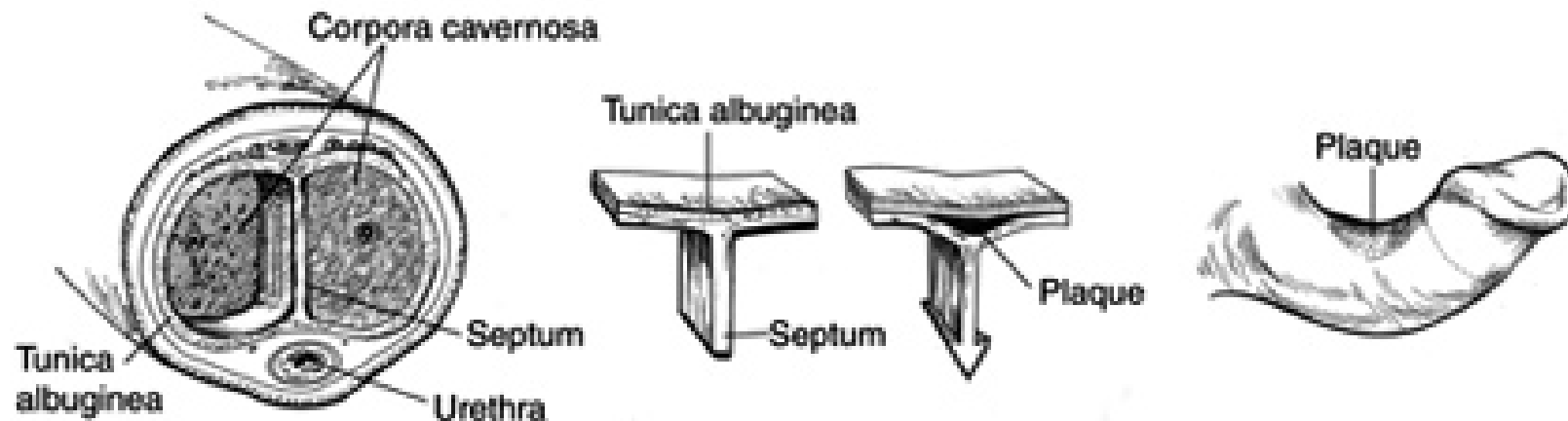
Bagcilar Training & Research Hospital, Istanbul

# + Cell Stretching- The Putative Mechanism of Penile Traction:

## An In Vitro Cellular Analysis

Ling De Young, Eric Chung and Gerald Brock

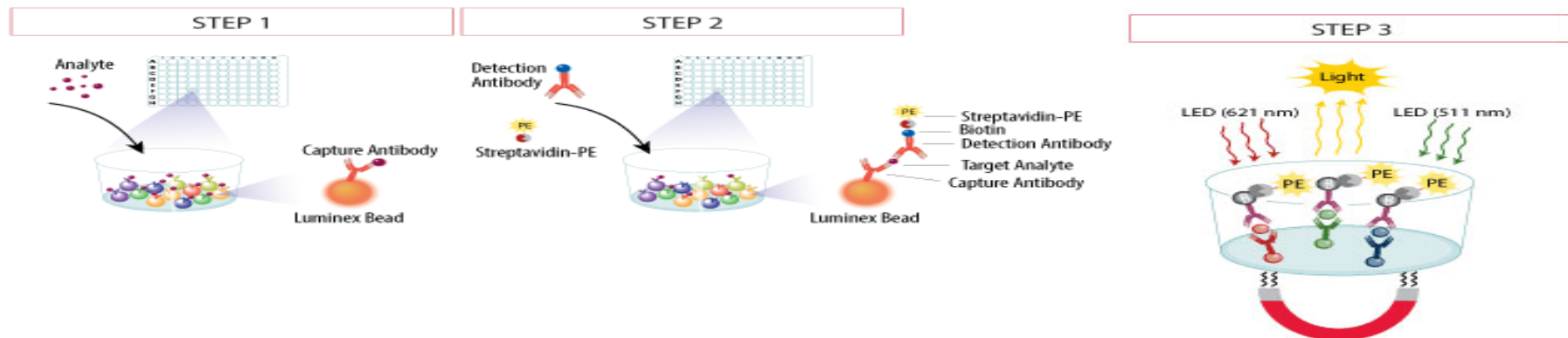
- Penile traction therapy (PTT) has gained considerable popularity in PD
- The exact mechanism of action of penile traction devices remains unknown.



# + Cell Stretching- The Putative Mechanism of Penile Traction: An In Vitro Cellular Analysis

Ling De Young, Eric Chung and Gerald Brock

- The third passage of primary cell cultures derived from Peyronie's plaques were sub-cultured
- Cell culture was analyzed by ELISA and Western blot for inflammatory cytokines, collagen, metalloproteinase, and tissue inhibitors of metalloproteinases (TIMPs) expression.



# + Cell Stretching- The Putative Mechanism of Penile Traction: An In Vitro Cellular Analysis

Ling De Young, Eric Chung and Gerald Brock

## ■ Conclusion

- Penile traction may facilitate plaque remodeling through
  - decreased metalloproteinase inhibitor TIMP 1 and 2
  - increased expression of MMP 12 and 13.



# + Hemolysis Contributes to PDE5 Dysregulation and Priapism in Sickle Cell Bone Marrow Transplanted Mice

Hotaka Matsui, Nikolai A. Sopko, Johanna L. Hannan, Biljana Musicki, Lewis L. Hsu, Dan E. Berkowitz, Hunter C. Champion, Arthur L. Burnett, and Trinity J. Bivalacqua

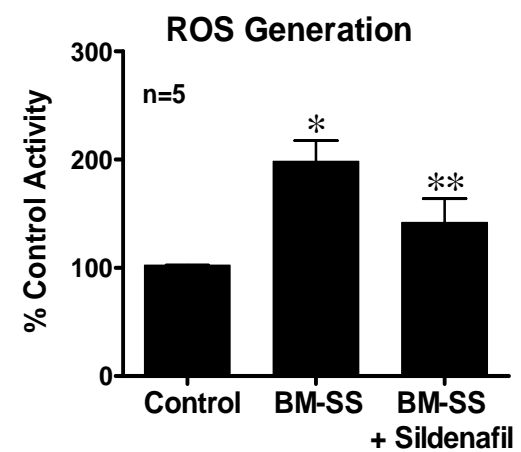
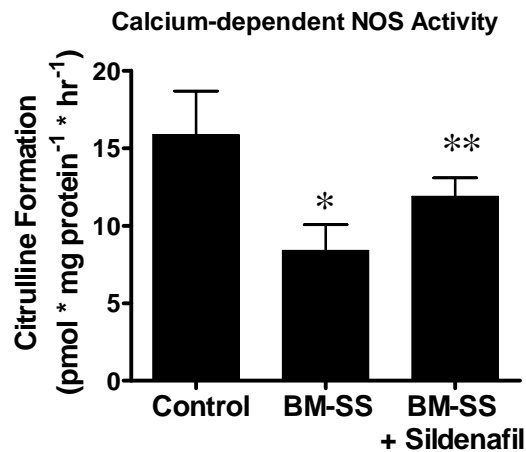
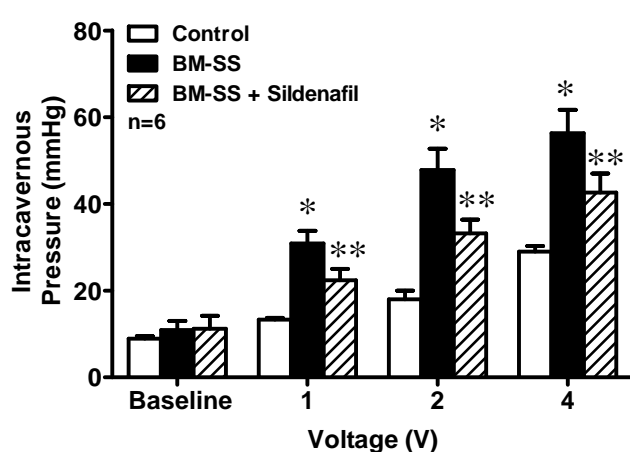
- Mechanisms responsible for “NO imbalance” in sickle cell-associated priapism are not fully elucidated.
- The aim of the study was to determine if acute hemolysis would result in
  - NO/cGMP/PDE5 dysregulation,
  - overproduction of ROS
  - ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
  - ,cause priapism in a sickle cell bone marrow transplanted mice.



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- Enhanced ICP in SCD mice penis can be lowered by Sildenafil
- Sildenafil corrected downregulated NOS/PKG activities in SCD mice
- Higher ROS generation in SCD mice reduced with Sildenafil

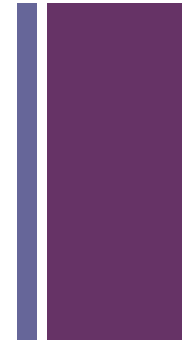


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## ■ Conclusion

- Priapic activity in SCD mice can be attributed to NO/PDE5 dysregulation
- Sildenafil treatment ameliorates priapism due to:
  - Restored NO balance
  - Decreased ROS generation
  - Increased PDE5 activity





# 3D bioprinting PCL Scaffolds for tissue engineering applications

Kwangsung Park, Insang Hwang, Hyun-Suk Lee, Jinju Park, Su A Park

## ■ Aim

- To investigate in vitro evaluation of a polycaprolactone (PCL) scaffold fabricated by 3D printing technique for tissue engineering applications in the field of sexual medicine.

## ■ Material and Method

- Scaffolds were seeded with human aortic smooth muscle cell (hSMC) at  $5 \times 10^5$  cells per scaffold.
- Seeded and control scaffolds were cultured under static conditions for up to 4 weeks.
- The ability of these scaffolds to support smooth muscle cell growth was investigated in vitro.





# + 3D bioprinting PCL Scaffolds for tissue engineering applications

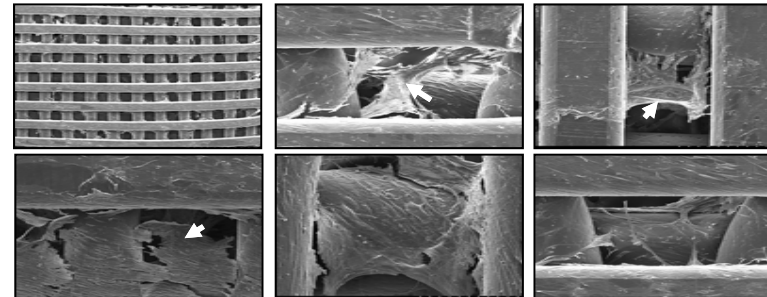
Kwangsung Park, Insang Hwang, Hyun-Suk Lee, Jinju Park, Su A Park

## ■ Result:

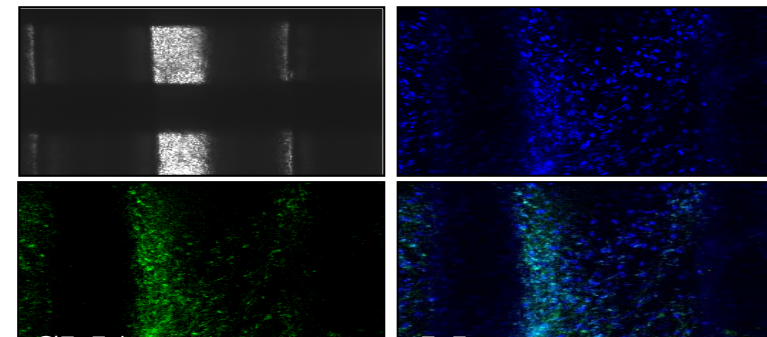
- hSMC cells covered all the surface of the PCL scaffold.
- Immunofluorescent staining images of  $\alpha$ -smooth muscle actin on hSMC cells/scaffolds confirmed that the cells remained viable and proliferated throughout the time course of the culture.

## ■ Conclusion:

- 3D printed PCL scaffolds could be used for tissue engineering applications in the field of sexual medicine.



*SEM examination of PCL scaffold after 4weeks culture showing hSMCs attached to the scaffold and forming 'cell sheets'.*



*Fluorescence microscopic images of hSMC cells cultured 4 weeks in vitro.*

# + Light-controlled relaxation of the penile corpus cavernosum using the novel nitric oxide releaser NOBL-1

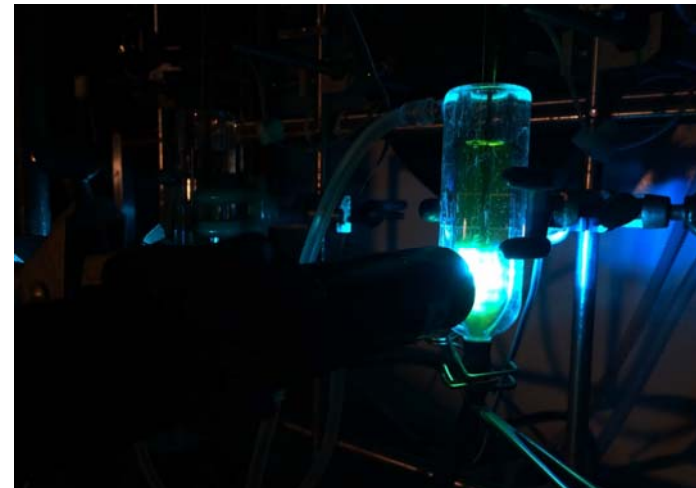
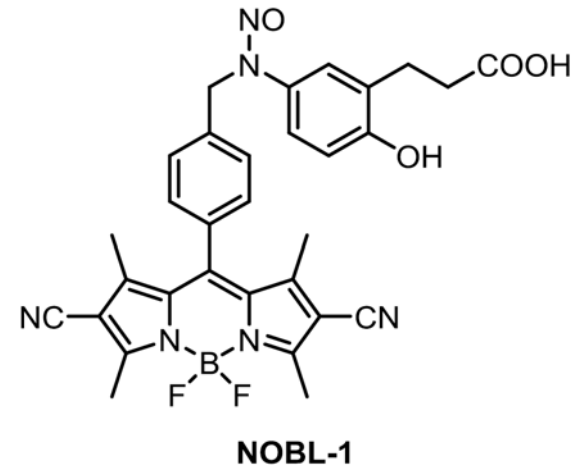
Y Hotta, N Ieda, H Nakagawa, K Kimura

## ■ Aim:

- The impact of a novel blue light-controllable NO releaser (NOBL-1) on relaxation of the corpus cavernosum smooth muscle was investigated

## ■ Materials and Methods.

- Male adult Wistar-ST rats were used
- Strips of CC was prepared for isometric tension study
- response of the corpus cavernosum smooth muscle to irradiation with blue light (470–500 nm) was measured



# + Light-controlled relaxation of the penile corpus cavernosum using the novel nitric oxide releaser NOBL-1

Y Hotta, N Ieda, H Nakagawa, K Kimura

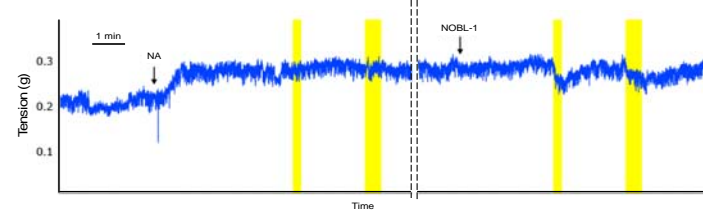
## ■ Results

- CC smooth muscle relaxed in response to blue-light irradiation
- After irradiation was stopped, relaxation at both concentrations of NOBL-1 disappeared

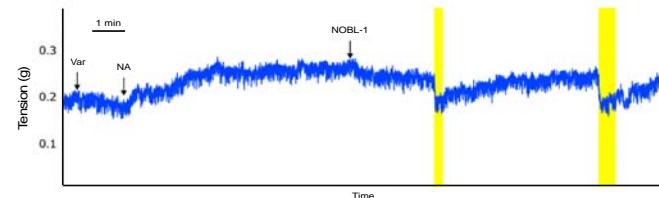
## ■ Conclusions

- Control of CC relaxation using NOBL-1 may be a useful tool

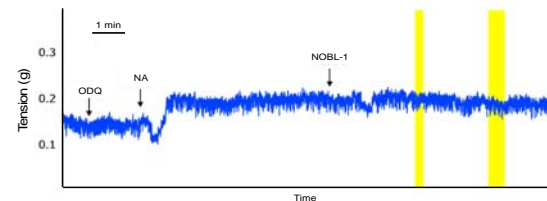
## Results



*Fig. 3* Response of the corpus cavernosum to light irradiation without (left) and with NOBL-1 (right). Yellow lines represent light irradiation (15 and 30 sec). NA., nardrenaline



*Fig. 4* Response of the corpus cavernosum to light irradiation with NOBL-1 and vardenafil. Yellow lines represent light irradiation (15 and 30 sec). Var., Vardenafil.



*Fig. 5* Response of the corpus cavernosum to light irradiation with NOBL-1 and ODQ, a GC inhibitor. Yellow lines represent light irradiation (15 and 30 sec). ODQ., 1H-[1,2,4]Oxadiazolo[4,3-a]quinoxalin-1-one; NA., noradrenaline.



# **Efficacy of pioglitazone on erectile function recovery in a rat model of post-prostatectomy erectile dysfunction**

Aliperti, L; Tan, R; Lasker G; Hagan S; Hellstrom JA; Gokce A; Trost L; Kadowitz P; Sikka S; Hellstrom W

## **■ Objectives**

- To examine the effect of pioglitazone on EF in a rat model of post-RP ED

## **■ Methods**

- 20 adult rats were divided into four groups:
  - a) sham
  - b) control - bilateral cavernosal nerve crush injury (BNCI)
  - c) BNCI + low-dose pioglitazone (PioL)
  - d) BNCI + high-dose pioglitazone (PioH)
- Following treatment, animals underwent surgery for ICP/MAP
- Corporal tissue was retrieved for histologic and molecular analysis



# + Efficacy of pioglitazone on erectile function recovery in a rat model of post-prostatectomy erectile dysfunction

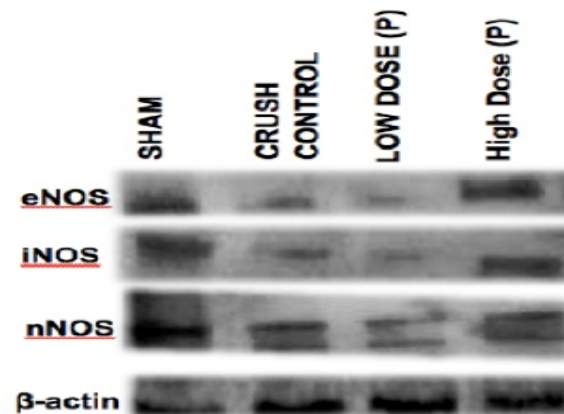
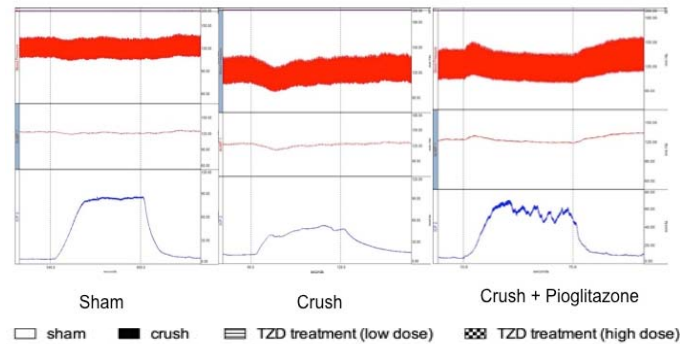
Aliperti, L; Tan, R; Lasker G; Hagan S; Hellstrom JA; Gokce A; Trost L; Kadowitz P; Sikka S; Hellstrom W

## ■ Results

- Animals treated with pioglitazone experienced dose-dependent improvements in ICP/MAP
- PioH animals demonstrated increased expression of eNOS and nNOS
- Both PioL and PioH had increased staining for anti-smooth muscle actin antibody and non-significant increases in cGMP

## ■ Conclusion

- Pioglitazone improves EF in rats undergoing BNCI via a nitric-oxide mediated pathway.





# Peripheral effects of opiates agonist in isolated corpus cavernosum

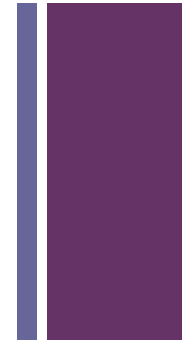
*Rodrigues, R; de Oliveira, M; Antunes, E; De Nucci, G; Mónica, F*

## ■ Objective

- The peripheral effects of opiates in the corpus cavernosum (CC) are controversial
- The aim of this work was to assess the peripheral effects of opiates in isolated CC from rats

## ■ Material and Methods

- Concentration-response curves to fentanyl, loperamide and endomorphin-1
  - non-selective opiate antagonist (naloxone 10  $\mu$ M),
  - selective  $\mu$ -opiate antagonist (ciprodime 100 nM),
  - soluble guanylyl cyclase inhibitor (ODQ 10  $\mu$ M),
  - nitric oxide synthase inhibitor (L-NAME, 100  $\mu$ M)
  - potassium channel blockers
- Basal and stimulated intracavernous pressure (ICP) before and after intracavernosal infusion of fentanyl (4  $\mu$ g/kg, 5 min).
- Immunohistochemical analysis for  $\mu$  and  $\delta$ - opioid receptors





# Peripheral effects of opiates agonist in isolated corpus cavernosum

*Rodrigues, R; de Oliveira, M; Antunes, E; De Nucci, G; Mónica, F*

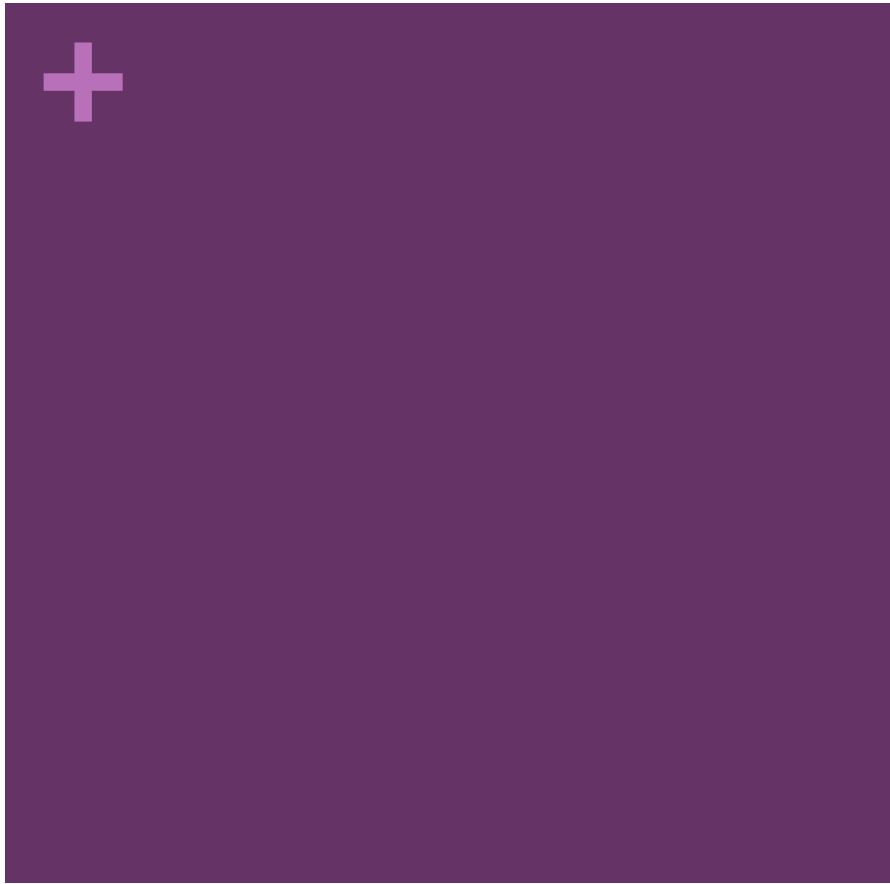
## ■ Results:

- Immunohistochemical analysis revealed the expression of  $\mu$  and  $\delta$ - opioid receptors in nerve fibers of CC.
- The  $\mu$ -opiate agonists fentanyl, loperamide and endomorphin-1 produced concentration-dependent relaxation

## ■ Conclusions

- Opioids receptors are expressed on CC and their agonists induced relaxation.





Thank you...