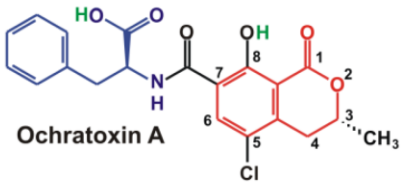
VALUTAZIONE DEGLI EFFETTI TOSSICI DELL'OCRATOSSINA IN VITRO ED IN VIVO E POSSIBILI STRATEGIE FARMACOLOGICHE

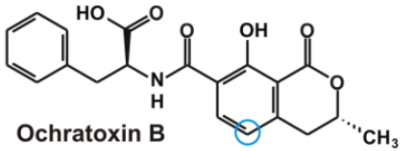
Dott.ssa Rosalia Crupi

Background

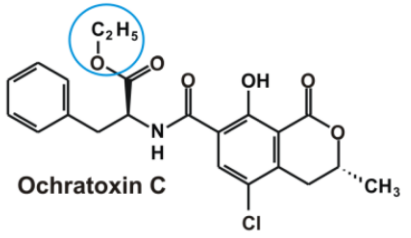
- Ochratoxins (OT) are a group of mycotoxins produced by different *Aspergillus* and *Penicillium* species
- Represent a common contaminant of both human and animal food products
- OT were described to be responsible for naturally occurring animal and human kidney diseases.



Ochratoxin A



Ochratoxin B



Ochratoxin C

Toxins **2010**, *2*, 771-779; doi:10.3390/toxins2040771

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Review

Ochratoxins—Food Contaminants: Impact on Human Health

Lalini Reddy [1,*] and Kanti Bhoola [2]

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[2] University of Western Australia, The Lung Institute of Western Australia, Ground Floor E Block, Sir Charles Gairdner Hospital, Nedlands WA, 6009, Australia; E-Mail: profbhoola@iinet.net.au

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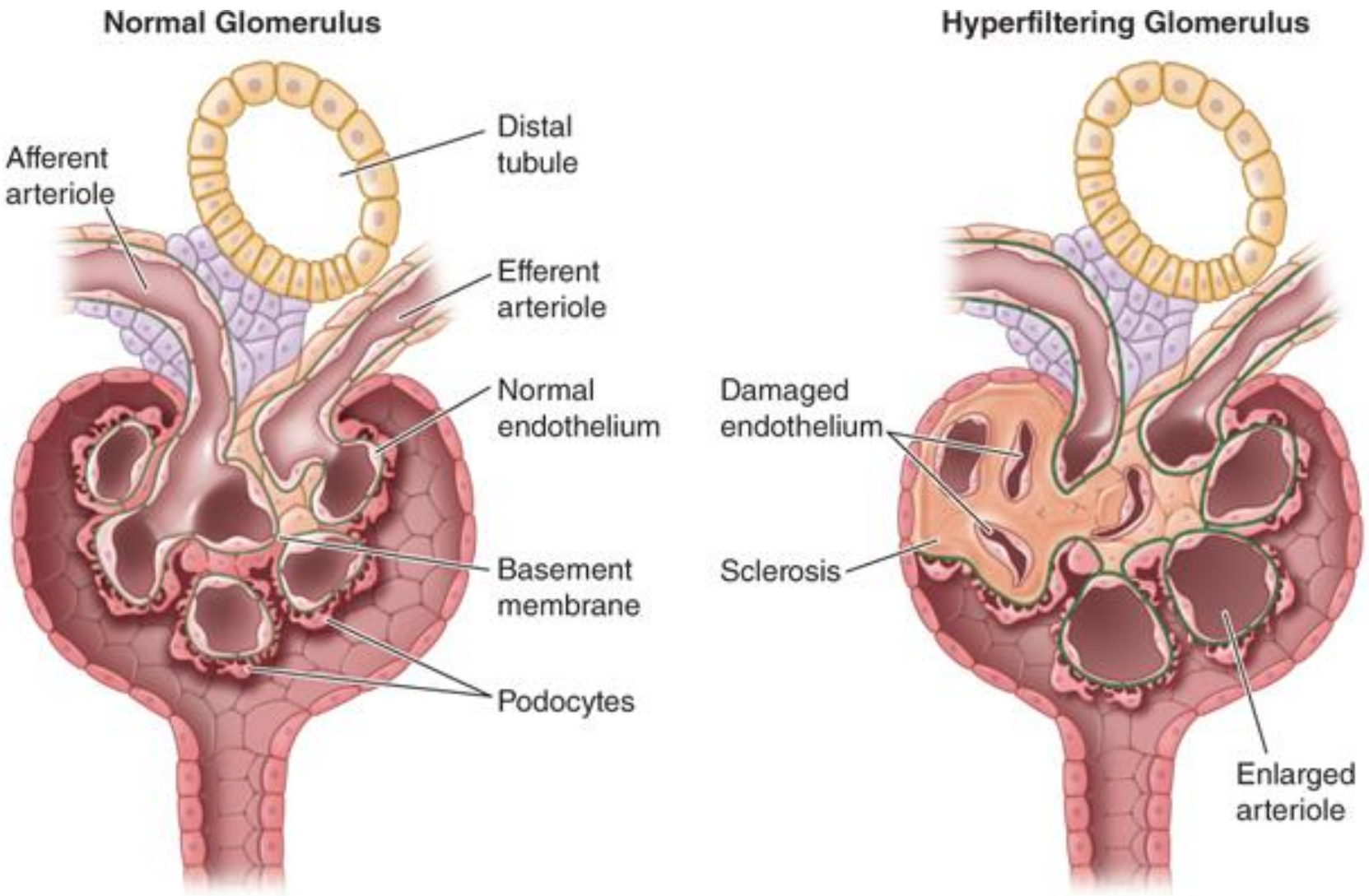
Crit Rev Food Sci Nutr. 2015 November 10; 55(13): 1860–1869. doi:10.1080/10408398.2012.724480.

Ochratoxin A and human health risk: A review of the evidence

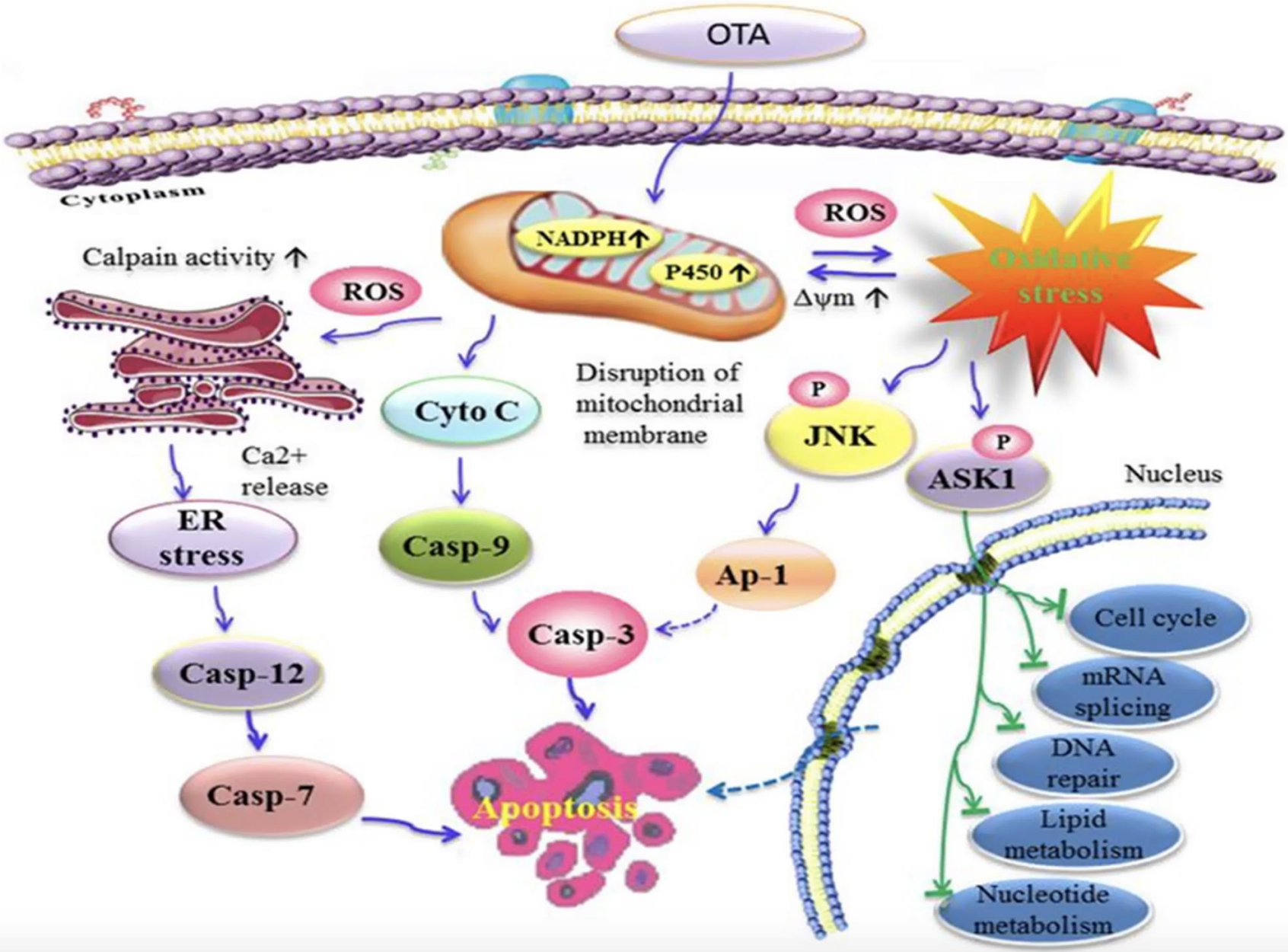
Travis R Bui-Klimke and **Felicia Wu**

Department of Environmental and Occupational Health, University of Pittsburgh (TB, FW)

Ochratoxin has a significant nephrotoxic potential

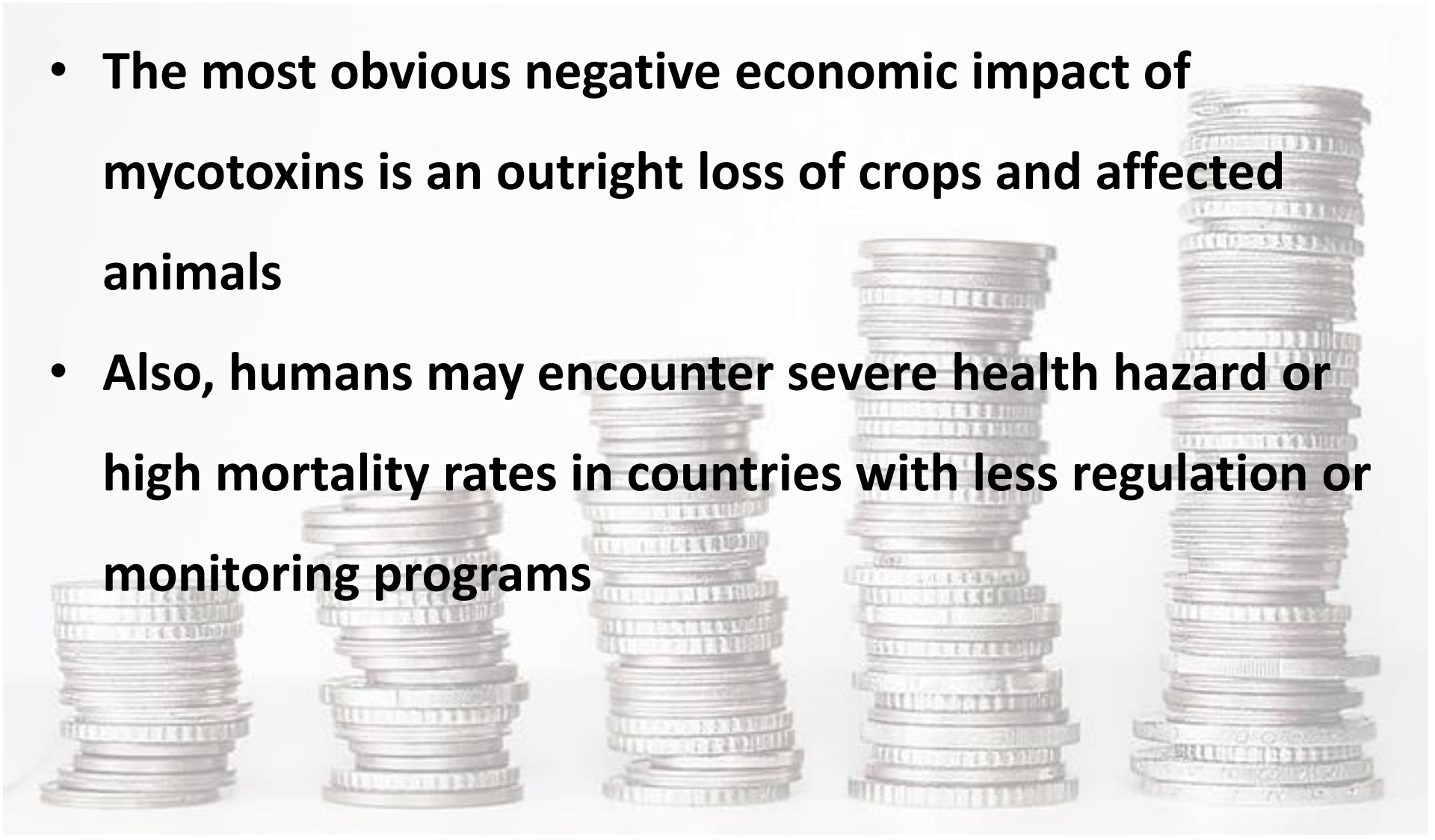


Oxidative stress

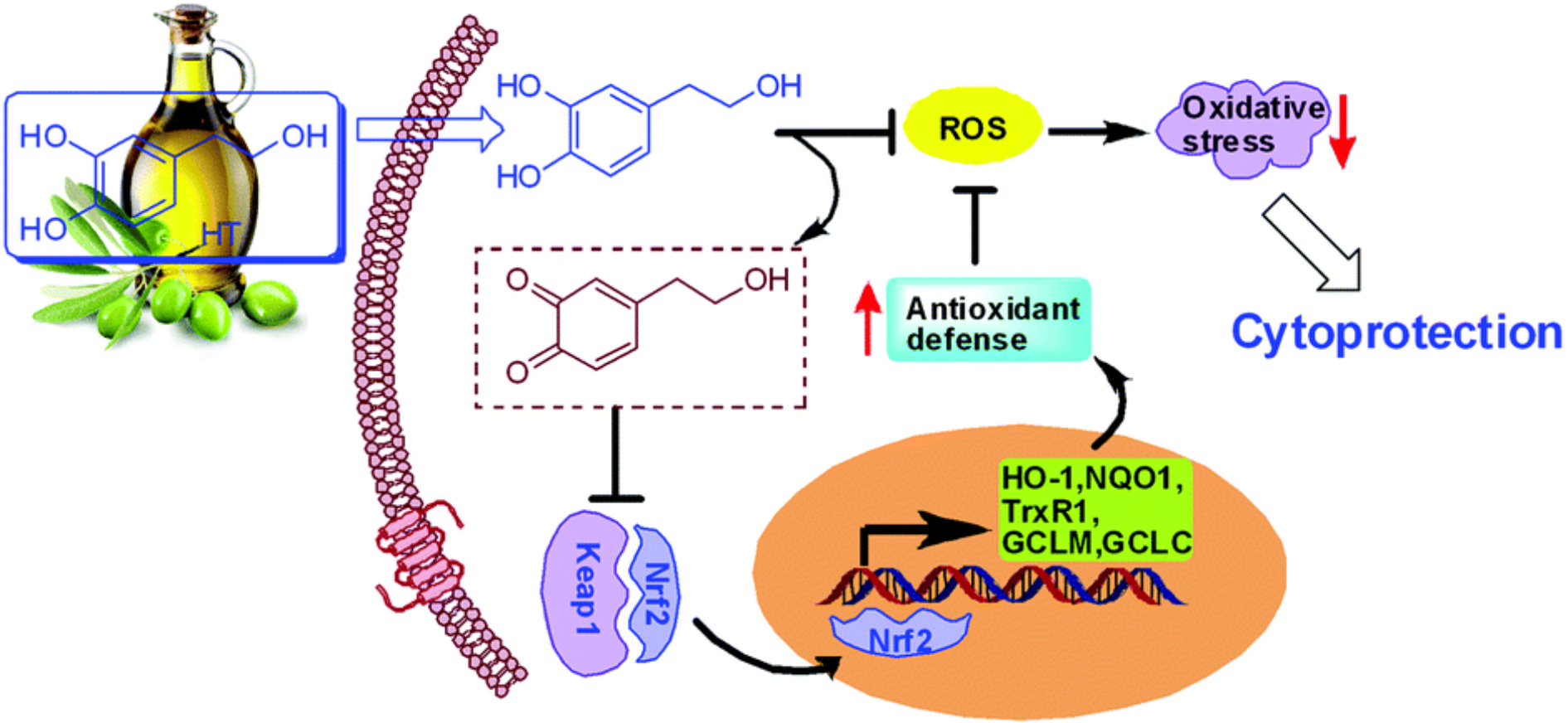


Econonomic Impact of Mycotoxin Contamination

- The most obvious negative economic impact of mycotoxins is an outright loss of crops and affected animals
- Also, humans may encounter severe health hazard or high mortality rates in countries with less regulation or monitoring programs



Hydroxytyrosol (HT), a phenolic constituent of extravirgin olive oil with a potent antioxidant activity



International Journal of
Molecular Sciences

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Review

Hydroxytyrosol and Cytoprotection: A Projection for Clinical Interventions

Francisca Echeverría [1], Macarena Ortiz [2], Rodrigo Valenzuela [1,*] and Luis A. Videla [3]

LAVORO ORIGINALE

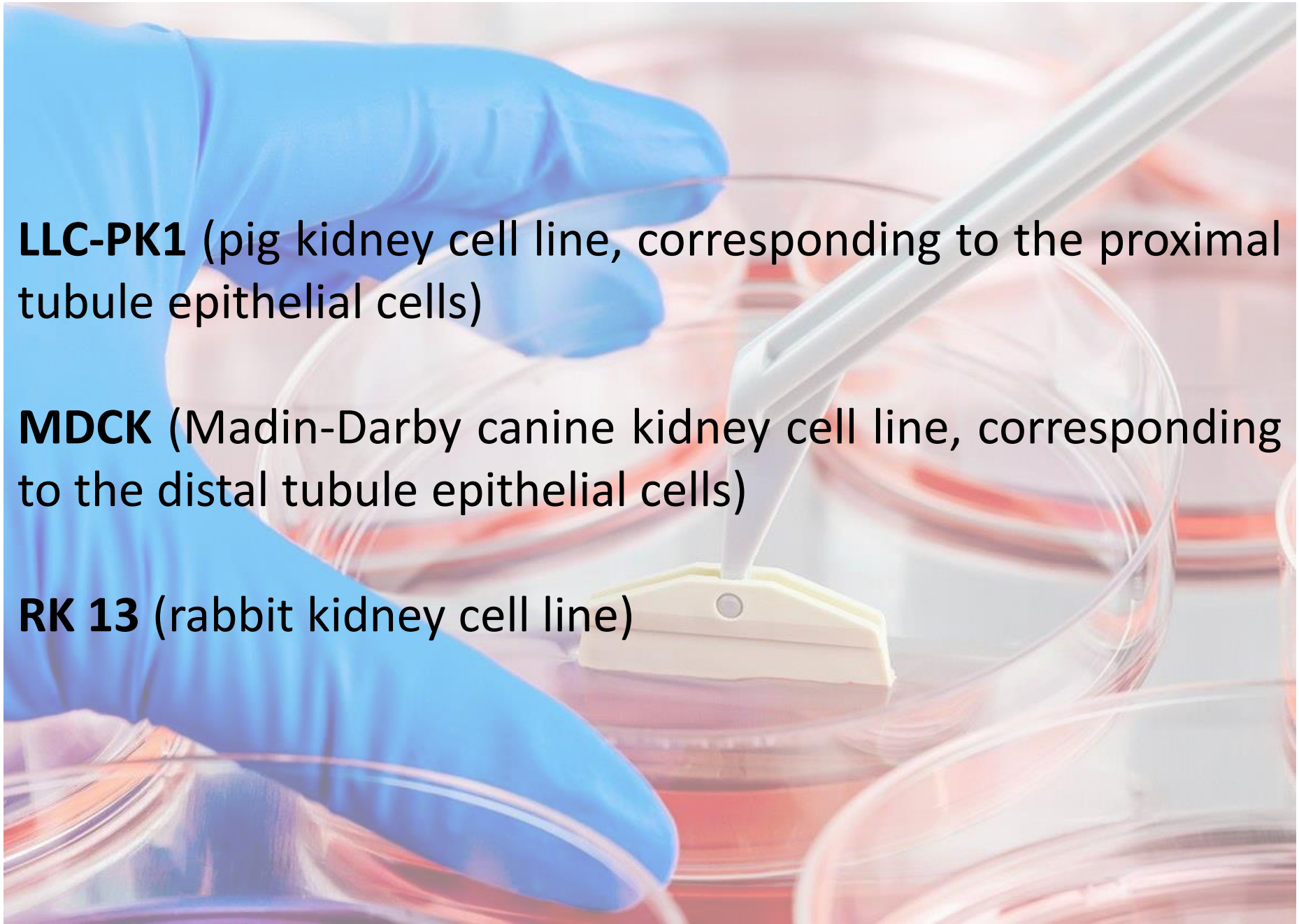
A. INCANI, M. DEIANA,
G. CORONA, A. ATZERI,
D. LORU, A. ROSA,
M.P. MELIS, A. CABRAS,
M.A. DESSÌ

Protective effect of hydroxytyrosol against oxidative stress in kidney cells

AIM-1

To assess the toxicity of OTA on renal cells and rats and the effect of HT treatment

Material and Methods-1

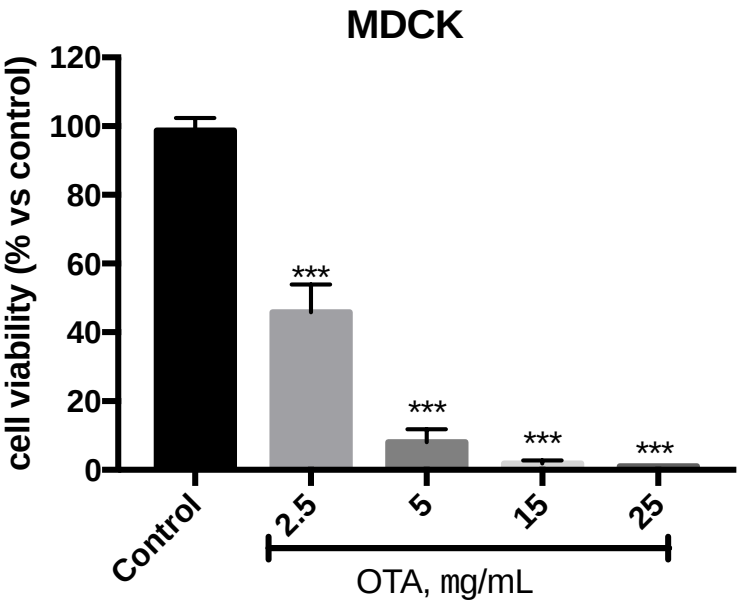


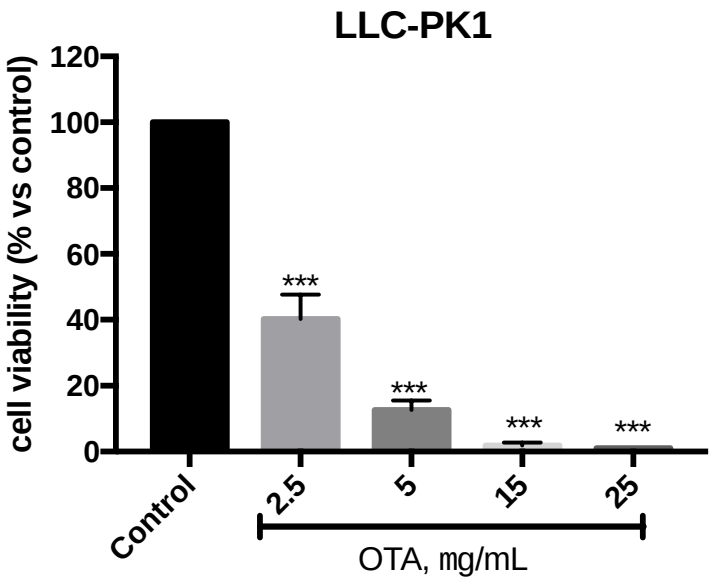
LLC-PK1 (pig kidney cell line, corresponding to the proximal tubule epithelial cells)

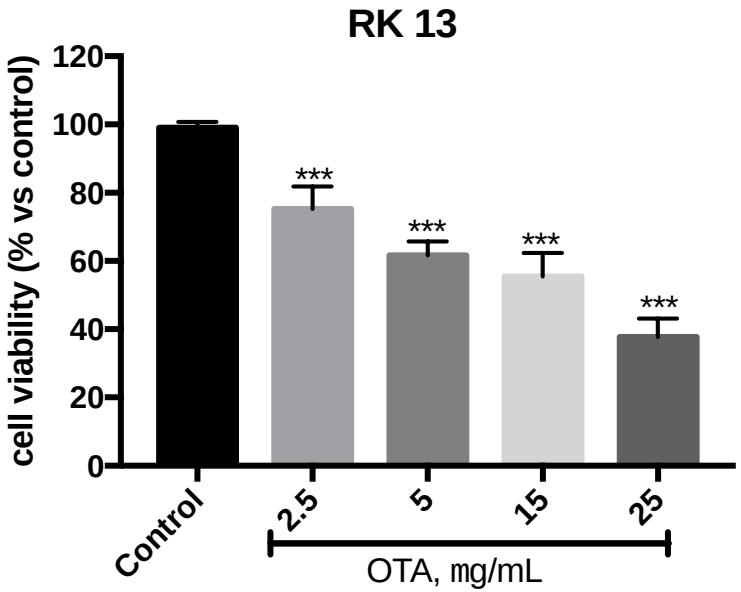
MDCK (Madin-Darby canine kidney cell line, corresponding to the distal tubule epithelial cells)

RK 13 (rabbit kidney cell line)

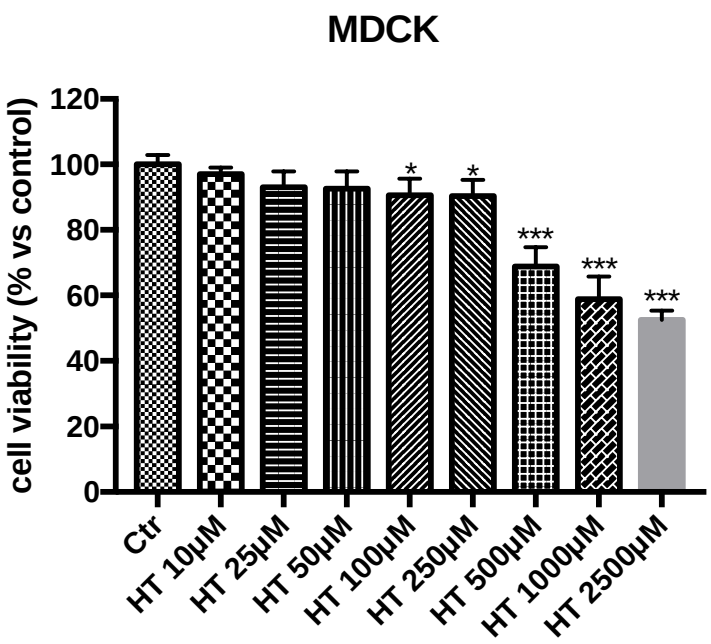
OTA cytotoxicity on cell viability

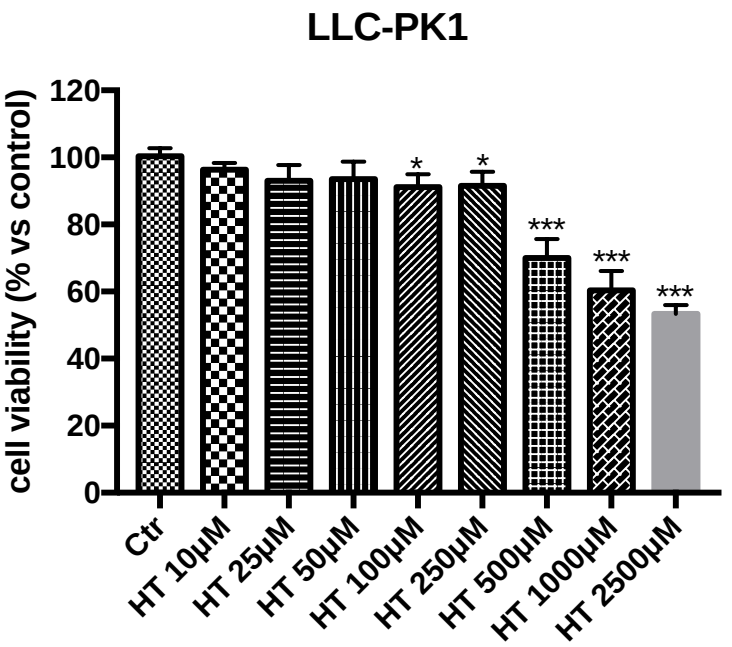


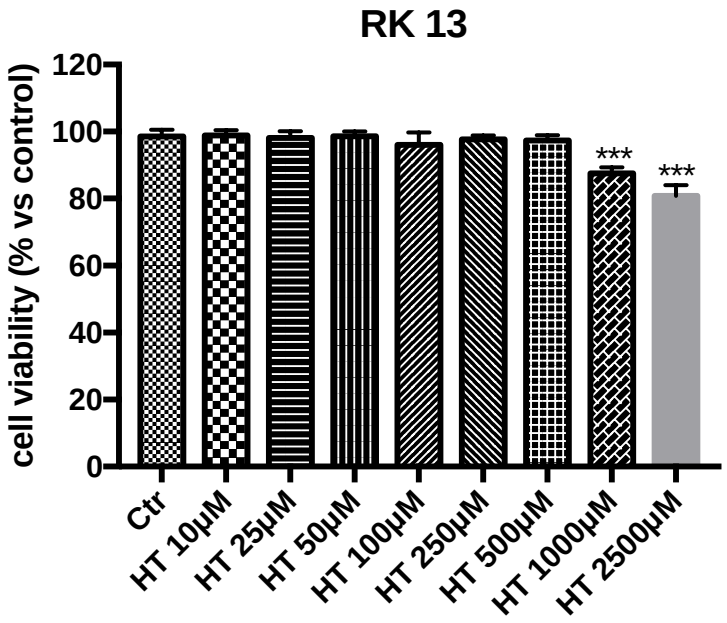




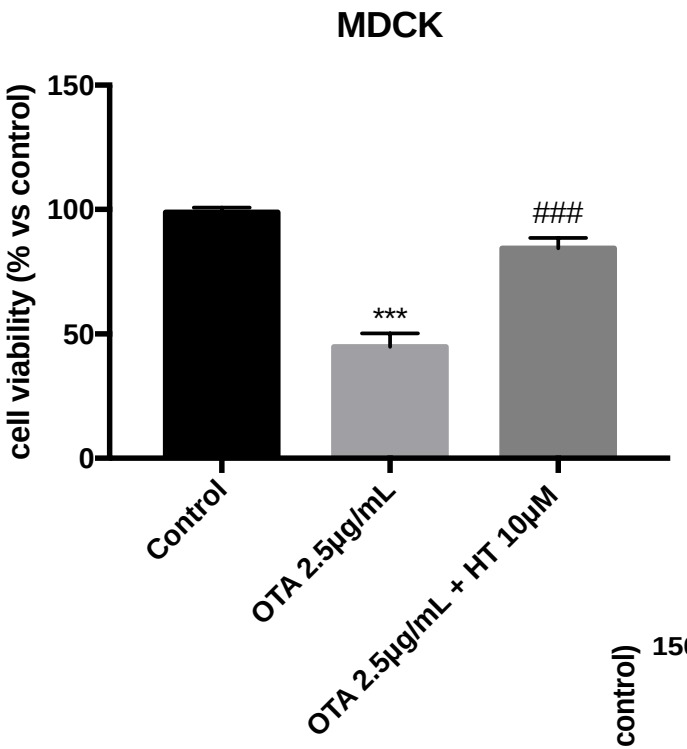
HT cytotoxicity on cell viability

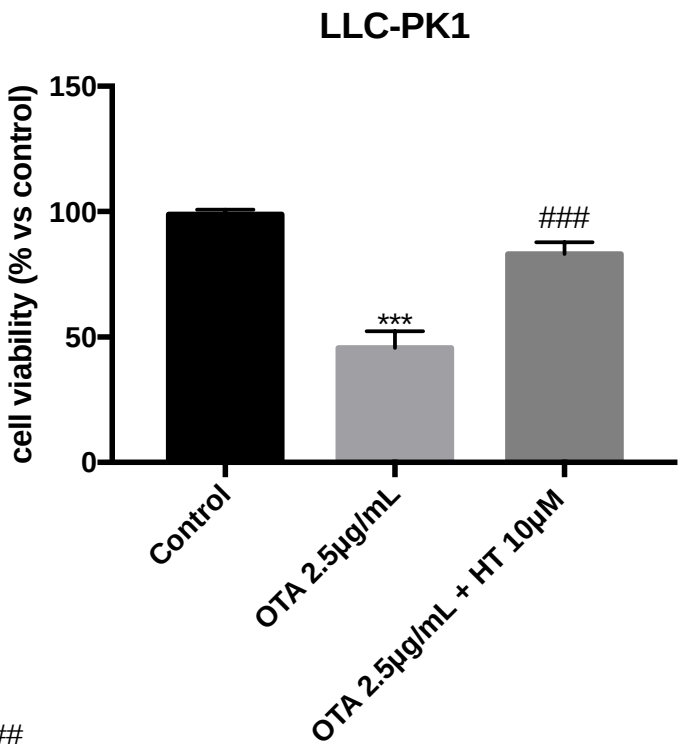


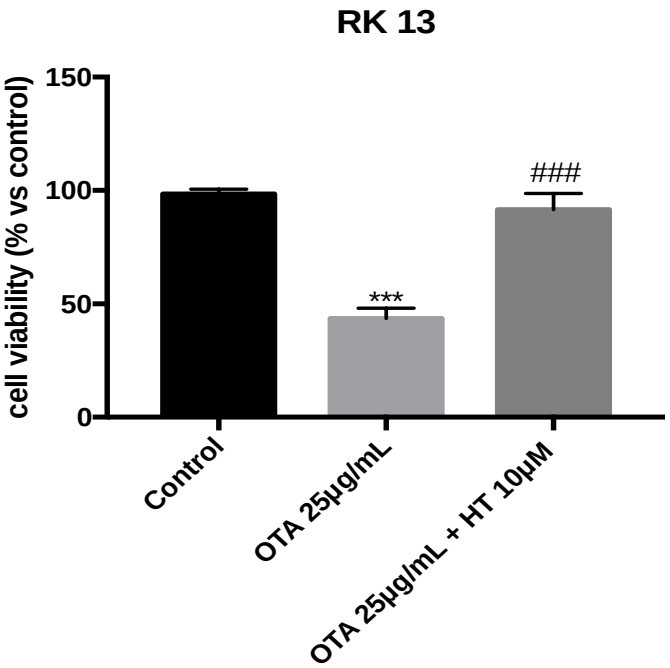




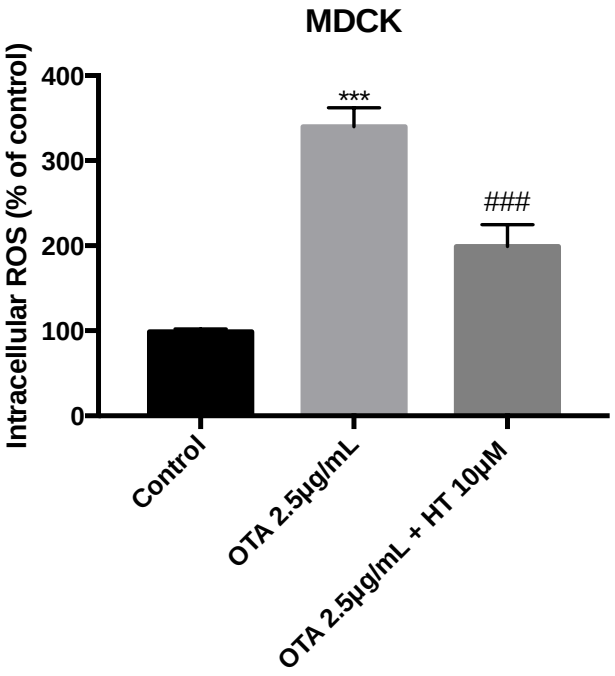
OTA cytotoxicity on cell viability

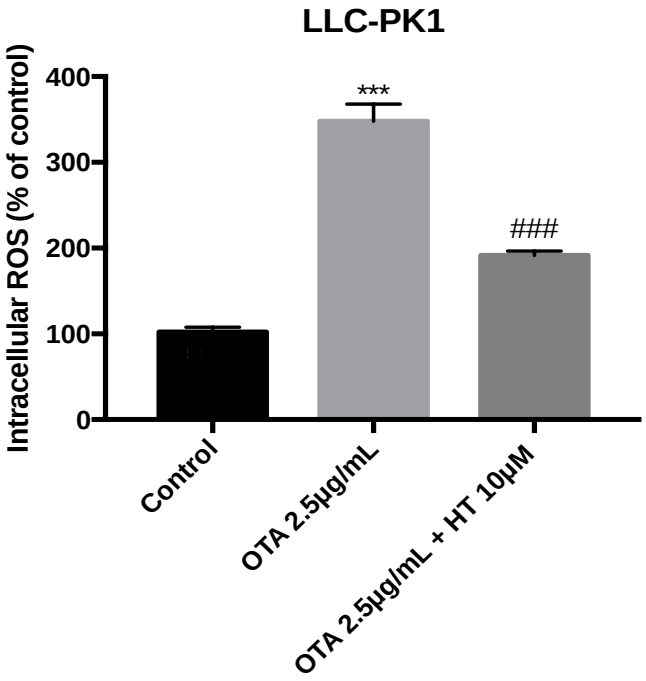


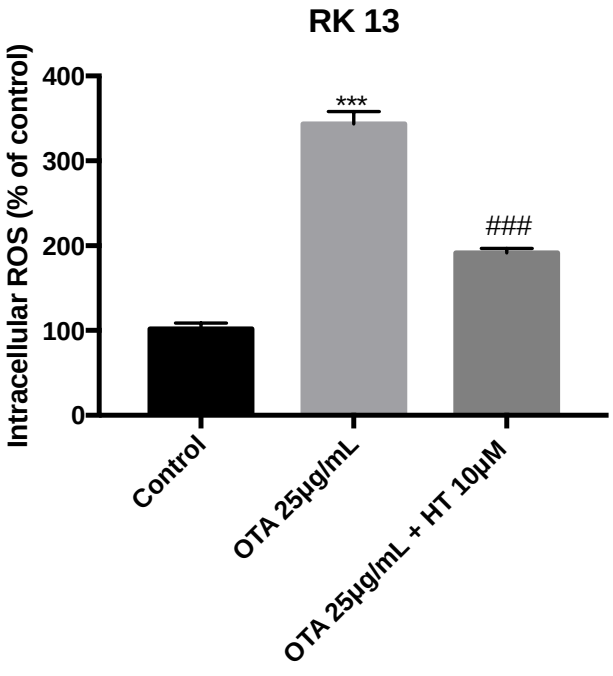




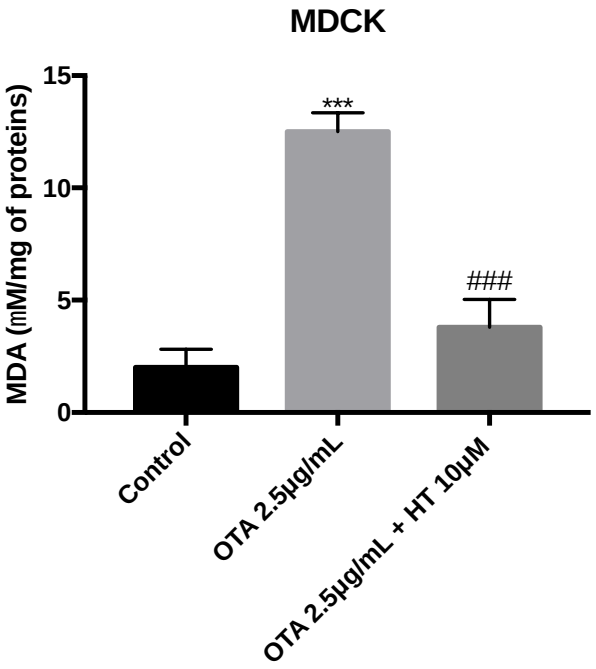
Effect of HT on ROS levels

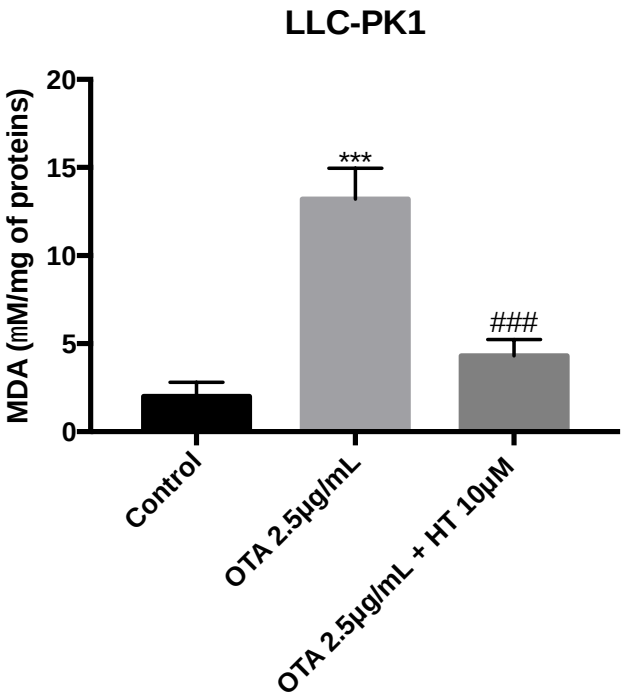


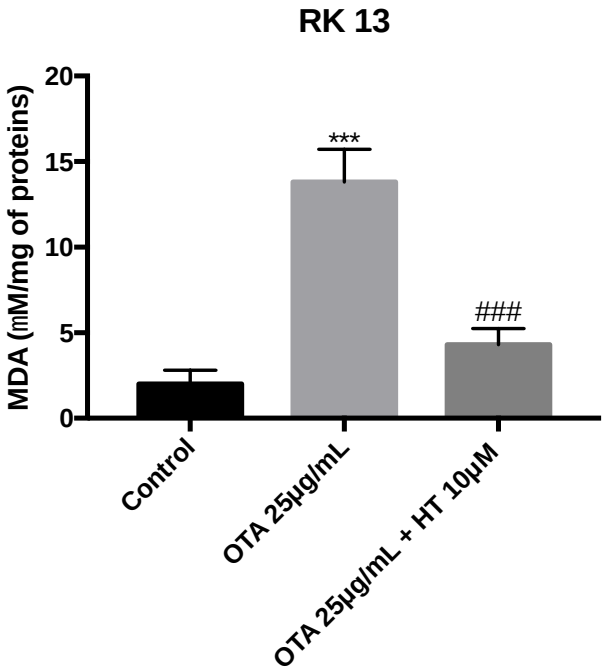




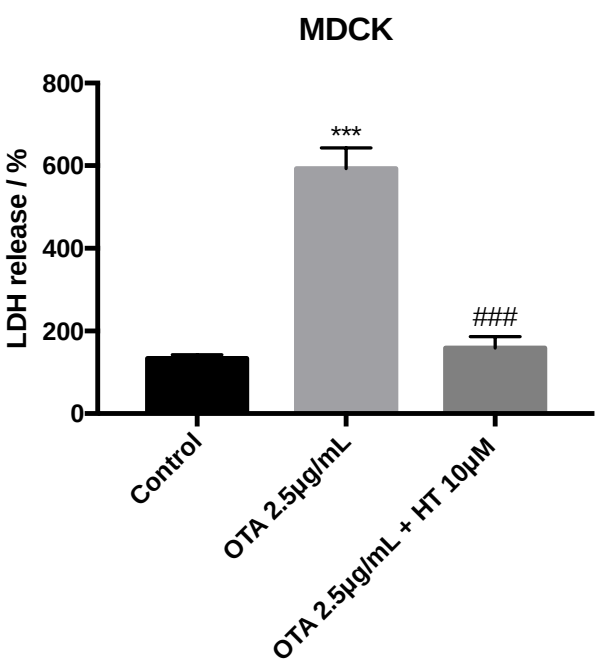
Effect of HT on MDA levels

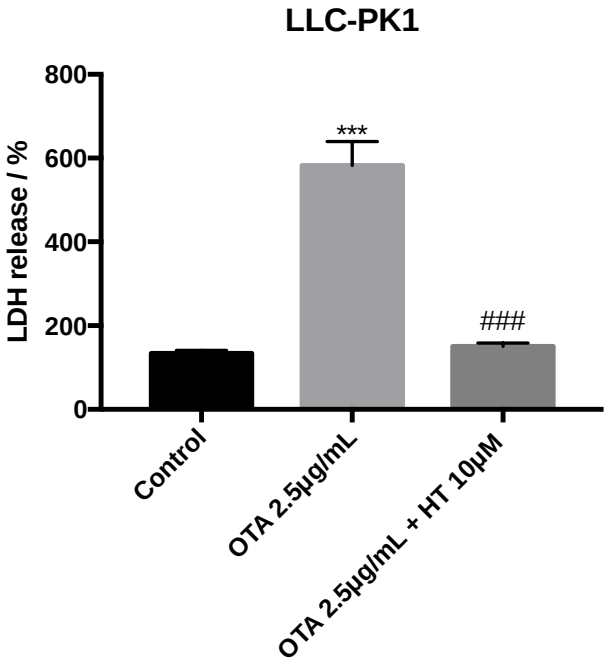


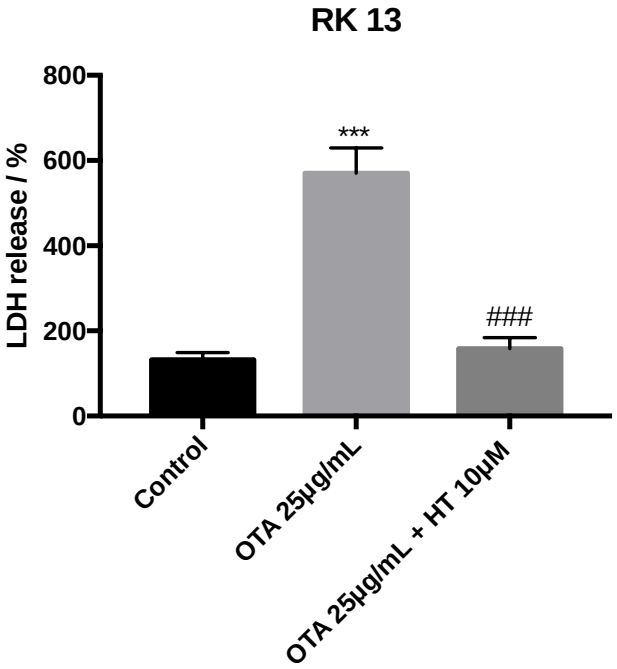




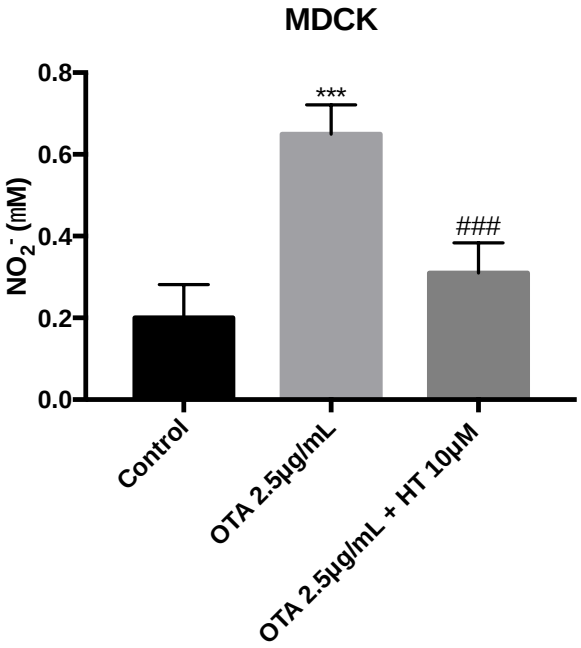
Effect of HT on LDH levels

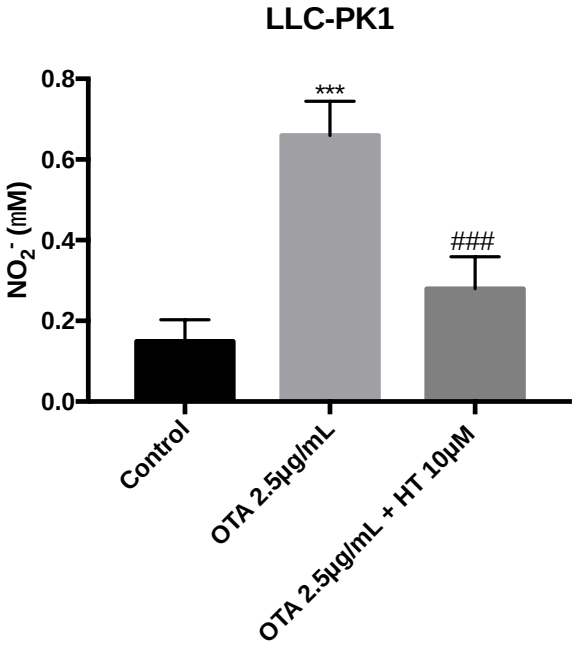


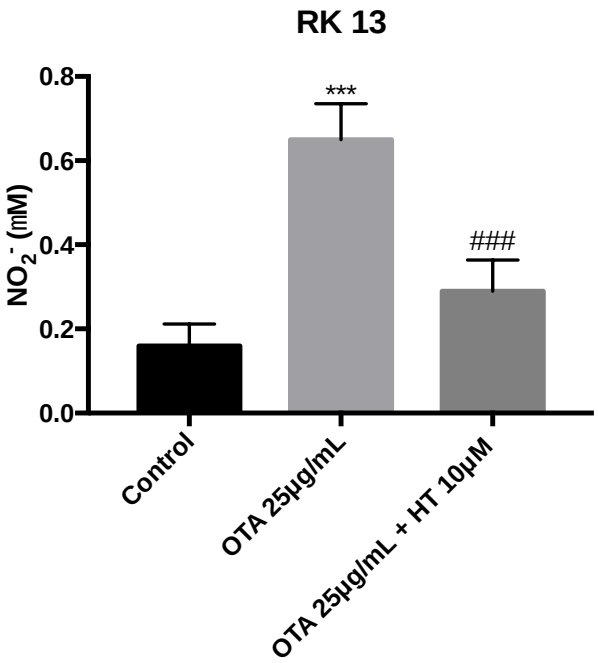




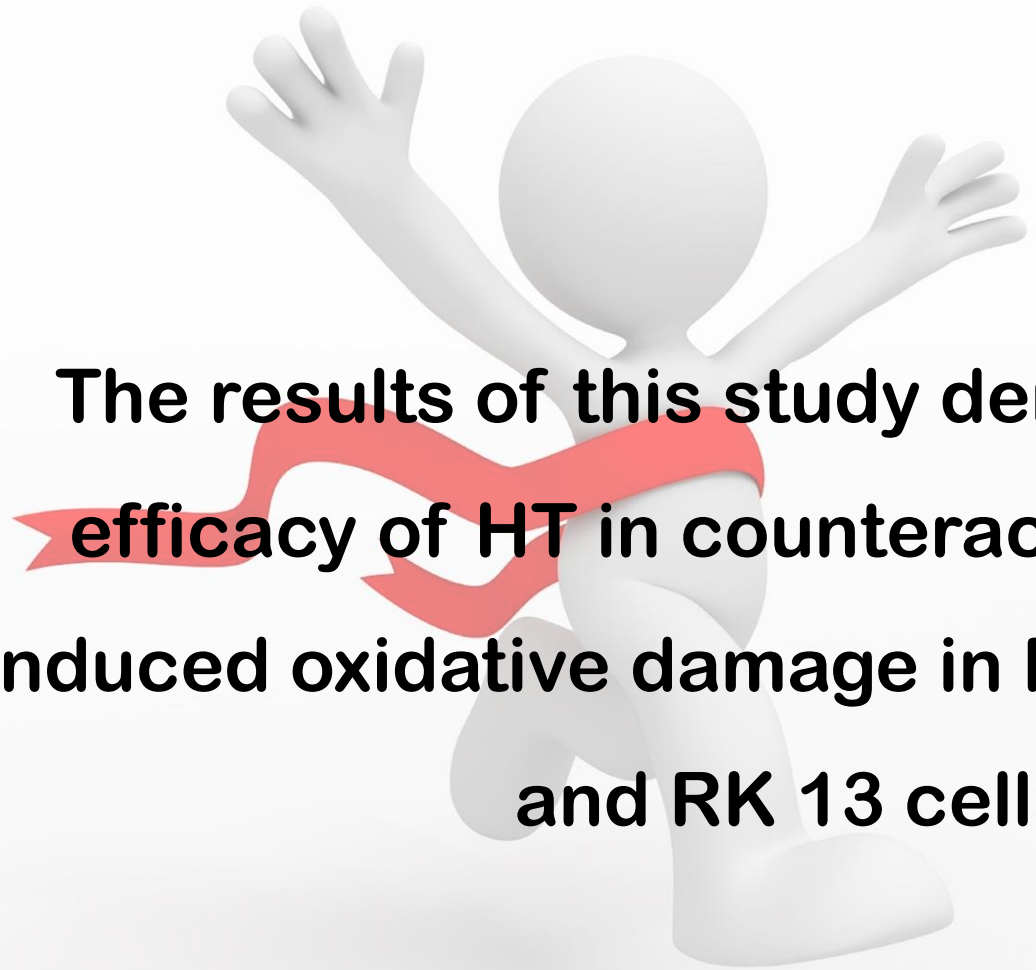
Effect of HT on Nitrite production after OTA-induced cell damage





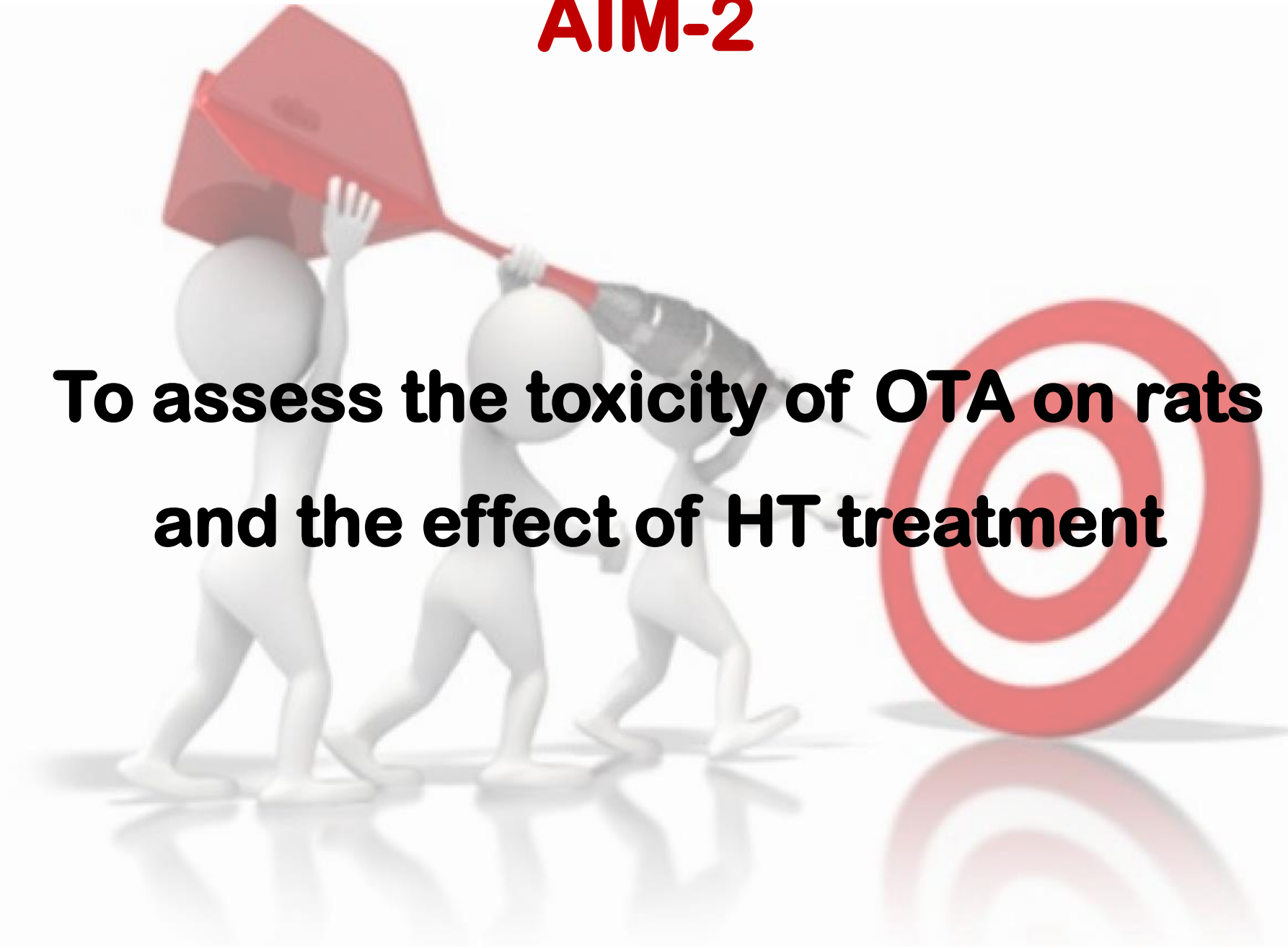


Conclusions-1



The results of this study demonstrate the efficacy of HT in counteracting the OTA-induced oxidative damage in MDCK, LLC-PK1 and RK 13 cells

AIM-2



To assess the toxicity of OTA on rats and the effect of HT treatment

Material and Methods-2

Experimental design

The rats were divided into 4 groups of 10 rats each.

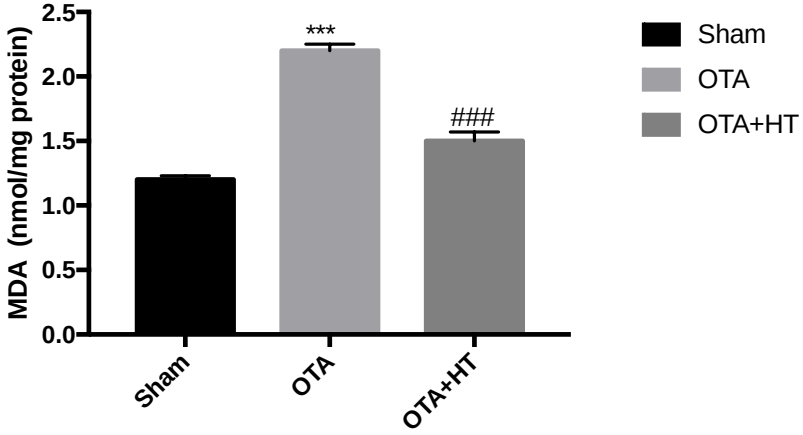
1.Sham + vehicle;

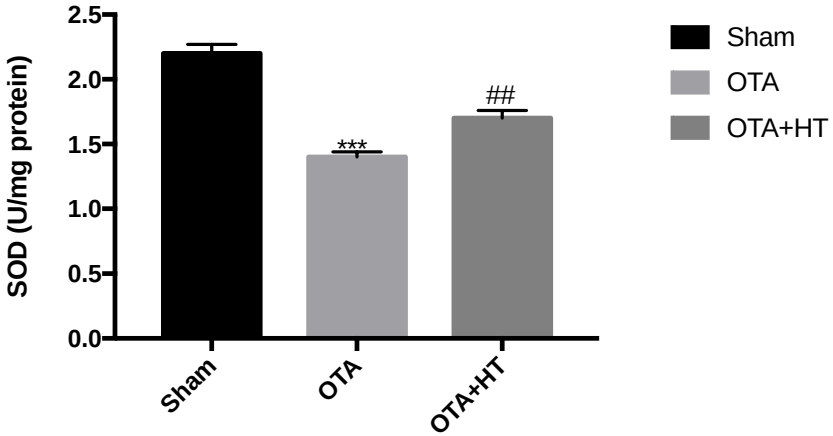
2.Sham + HT: Each rat received an i.p. of HT at the dose of 20mg/kg/twice daily (data not shown);

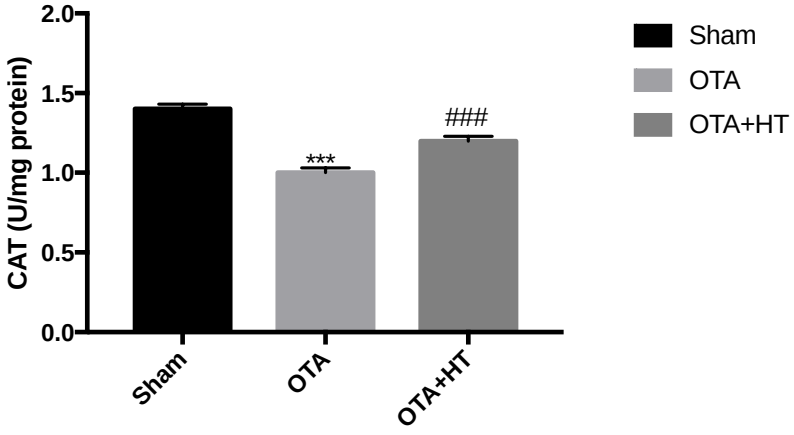
1.OTA group: received OTA, orally, at the dose of 250 μg/kg for 90 days;

2.OTA + HT group: received OTA, as described above, plus the administration of HT i.p. at the dose of 20mg/kg/twice daily.

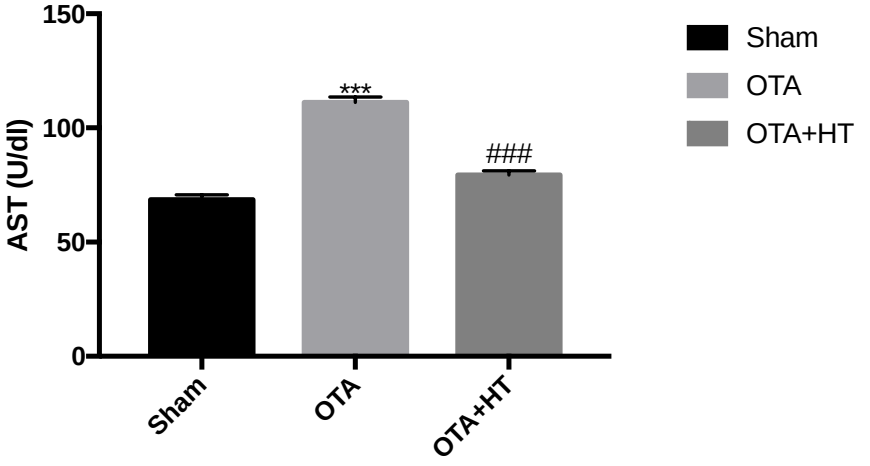
Effect of HT treatment on oxidative stress markers alteration after OTA-administration

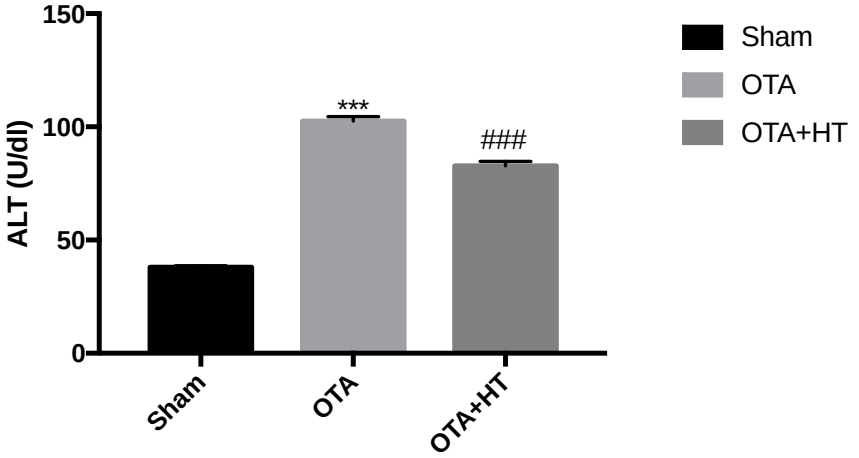


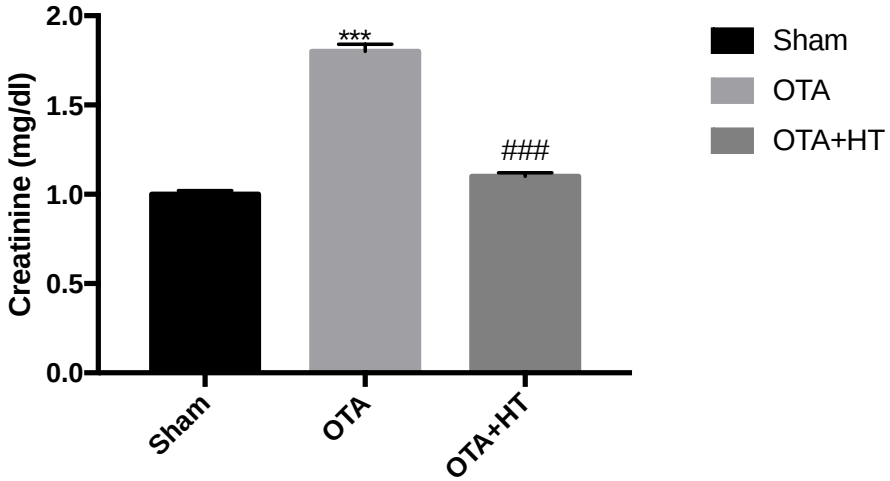




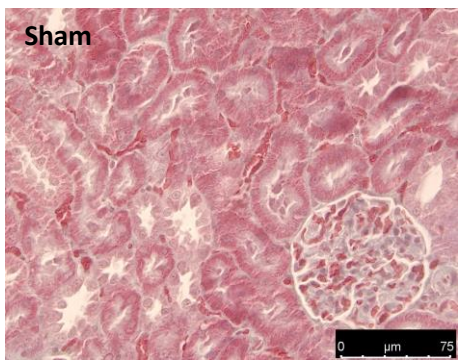
Effect of HT treatment on AST, ALT and creatinine after OTA-administration

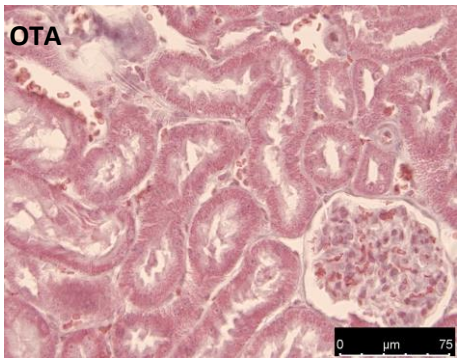


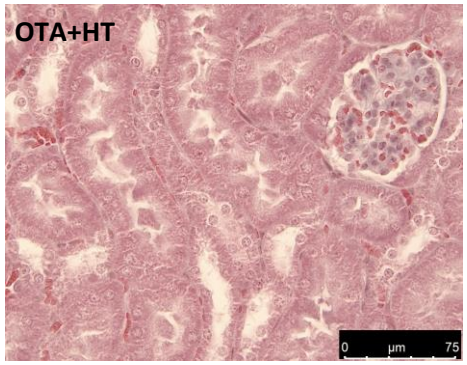


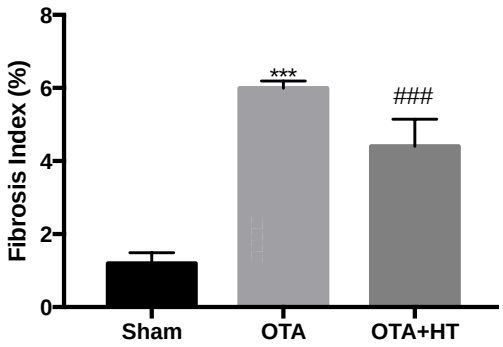


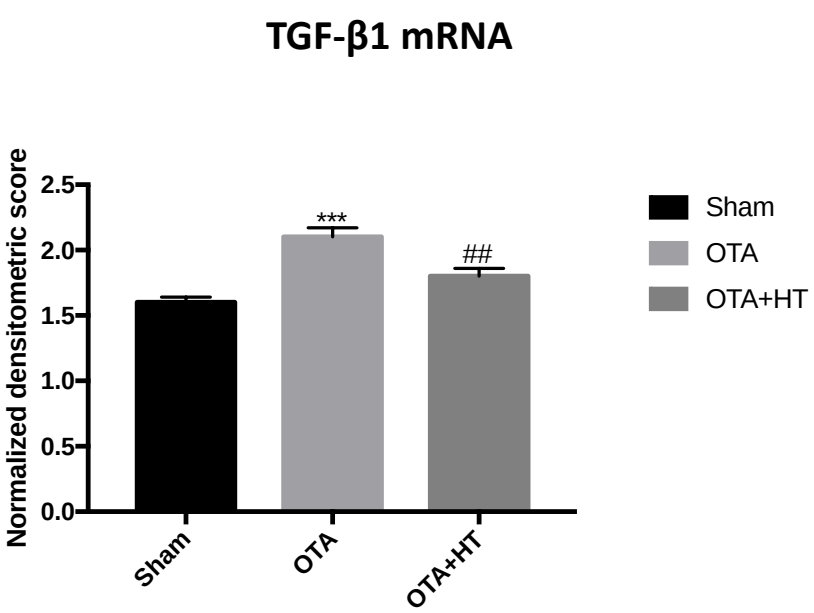
Effect of HT administration on kidney fibrosis, TGFβ-1 and α-sma expressions

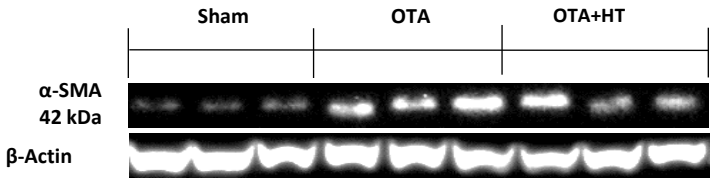


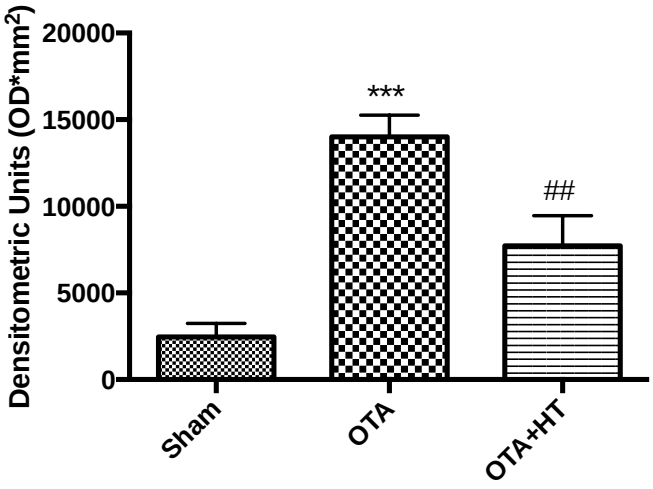




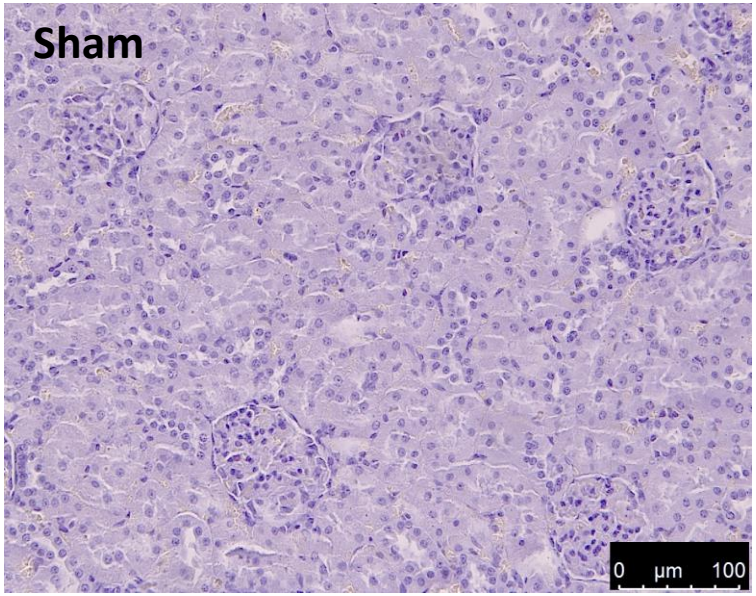


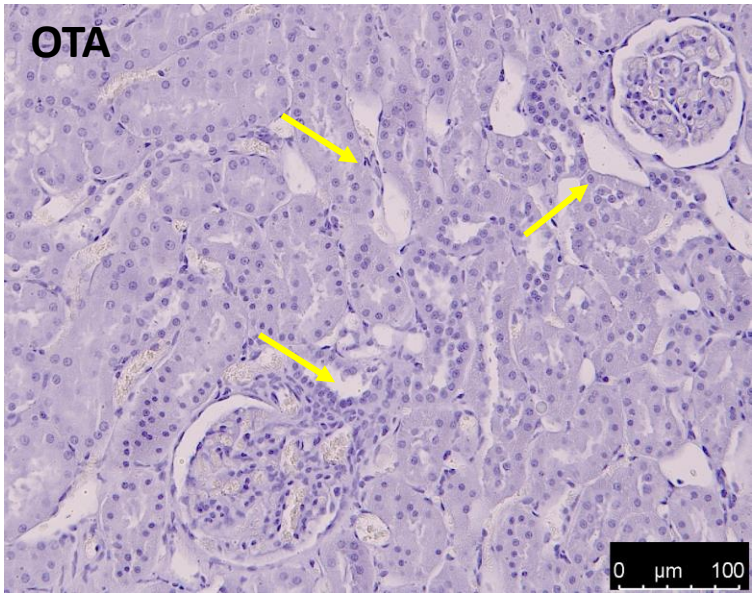


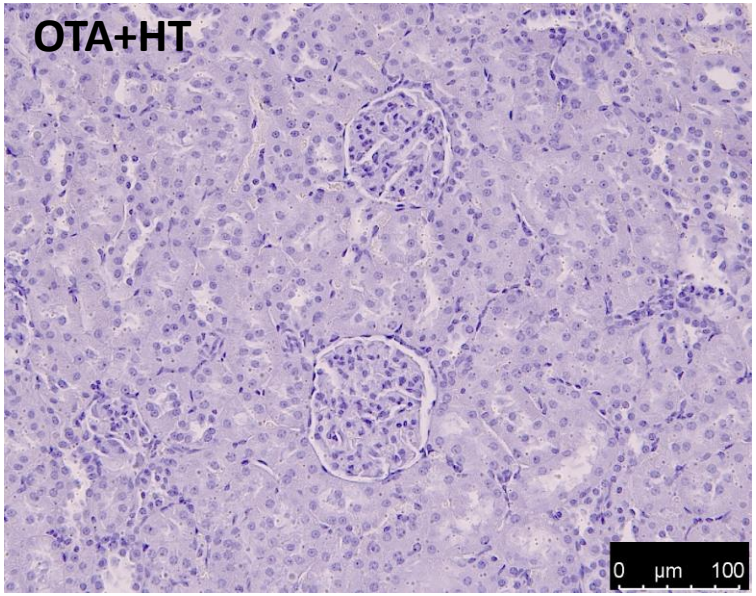




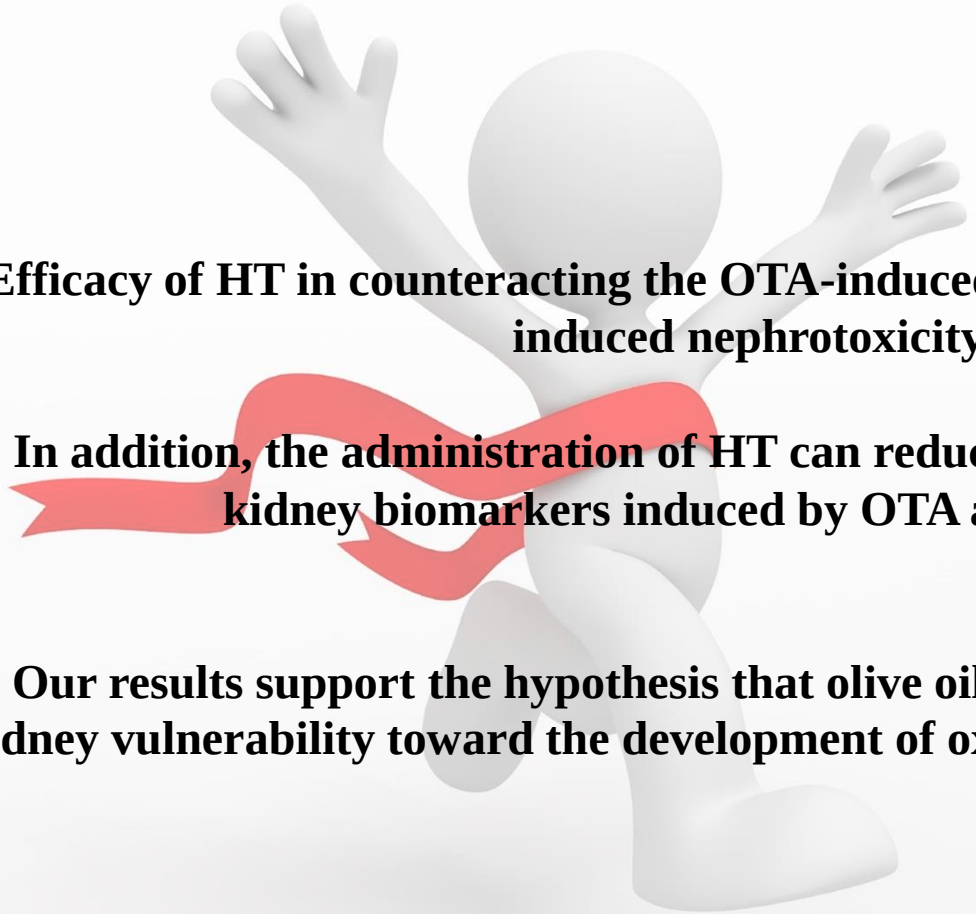
Effect of HT administration on kidney histology







Conclusions-2



- **Efficacy of HT in counteracting the OTA-induced oxidative damage against OTA-induced nephrotoxicity in rats**
- **In addition, the administration of HT can reduce the abnormalities of liver and kidney biomarkers induced by OTA administration in rats**
- **Our results support the hypothesis that olive oil phenolics may help to decrease kidney vulnerability toward the development of oxidative stress related renal failure**

Thank you

- ***Prof. Salvatore Cuzzocrea***
- ***All my colleagues……***