Curcumin and Metabolic Diseases

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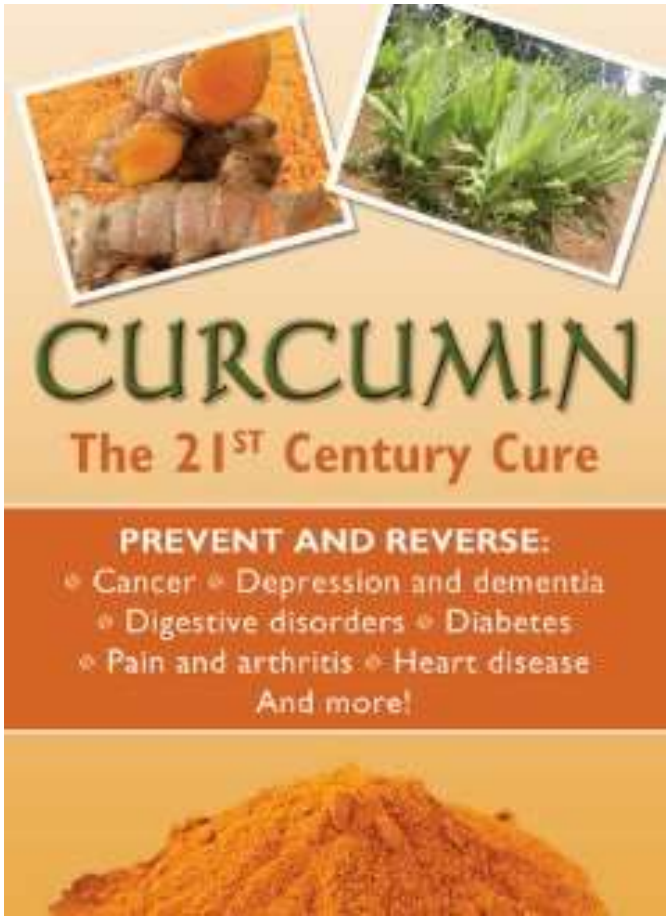

CURCUMIN
The 21ST Century Cure
PREVENT AND REVERSE:
Cancer Depression and dementia
Digestive disorders Diabetes
Pain and arthritis Heart disease
And more!


Curcumin C
Complex

Effect of Curcumin on Chronic Kidney Disease

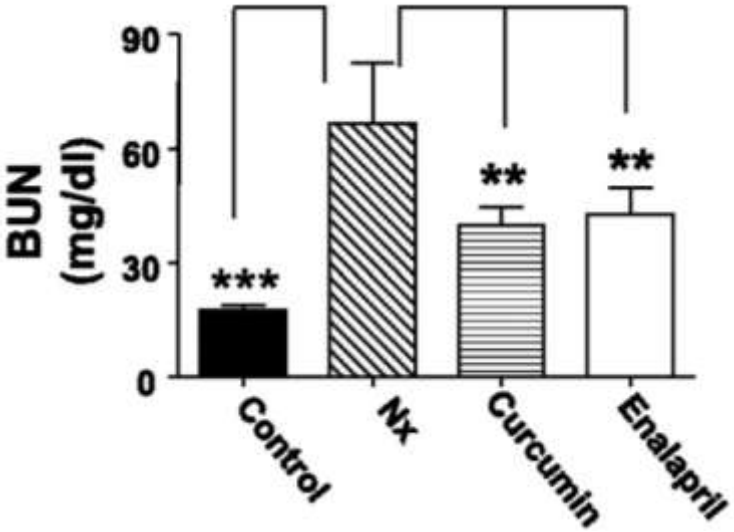
Control: Sham surgery

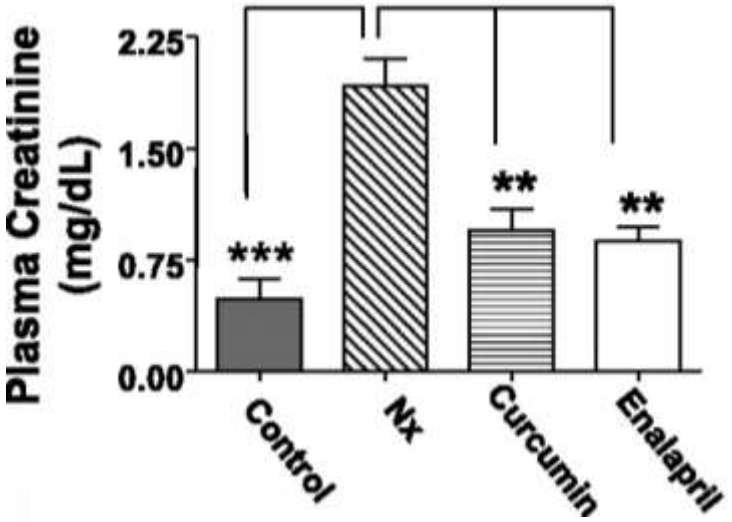
NX: 5/6th Nephrectomy

Supplementation with Curcumin or Enalapril

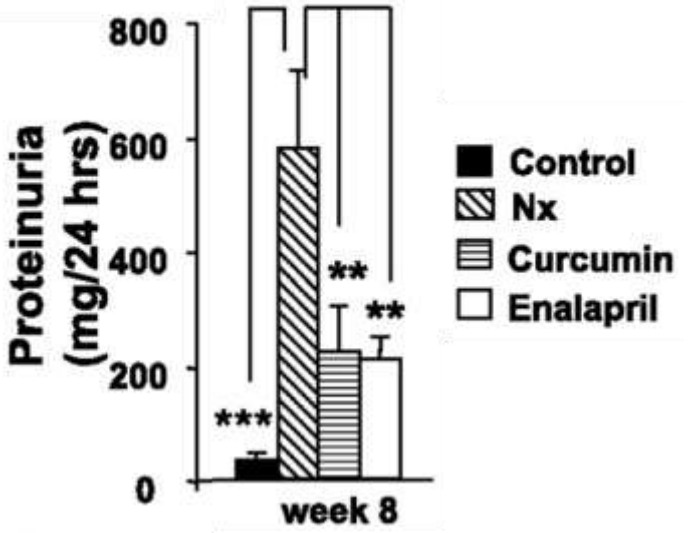
- **Collect Plasma**
- **Collect urine**
- **Evaluate Kidney Function**

Supplementation with curcumin attenuates Kidney Disease





- **Nx** – Animal model for kidney disease
- **Enalapril** – Currently used drug for kidney disease



Ghosh SS et el: Am J Physiol Renal Physiol. 296:F1146-57, 2009

Effect of Curcumin on Diabetes and Heart Disease

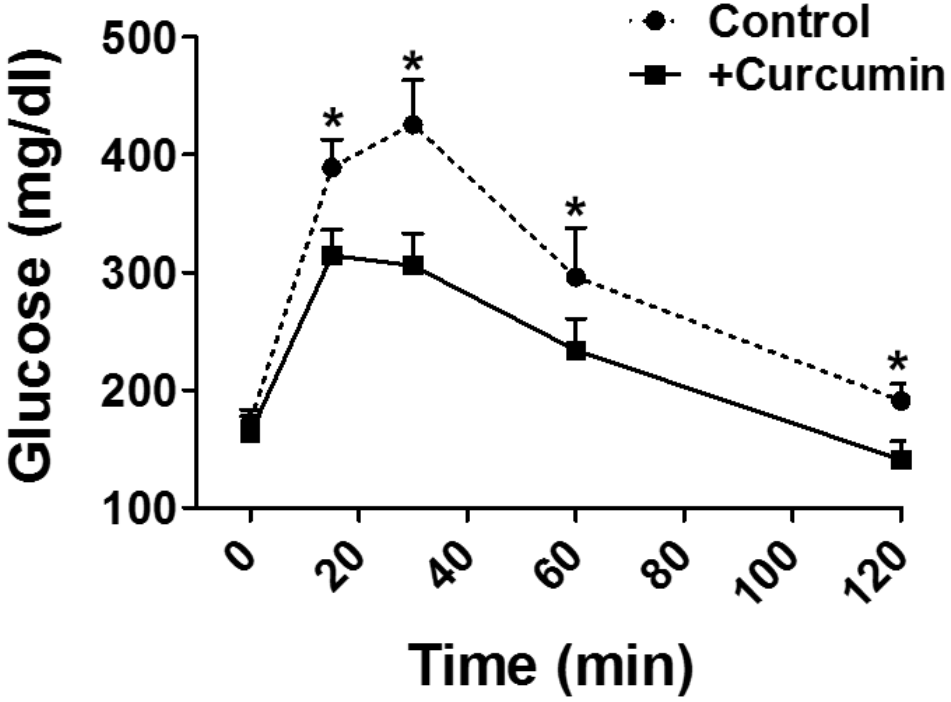
LDLR-/- Mice

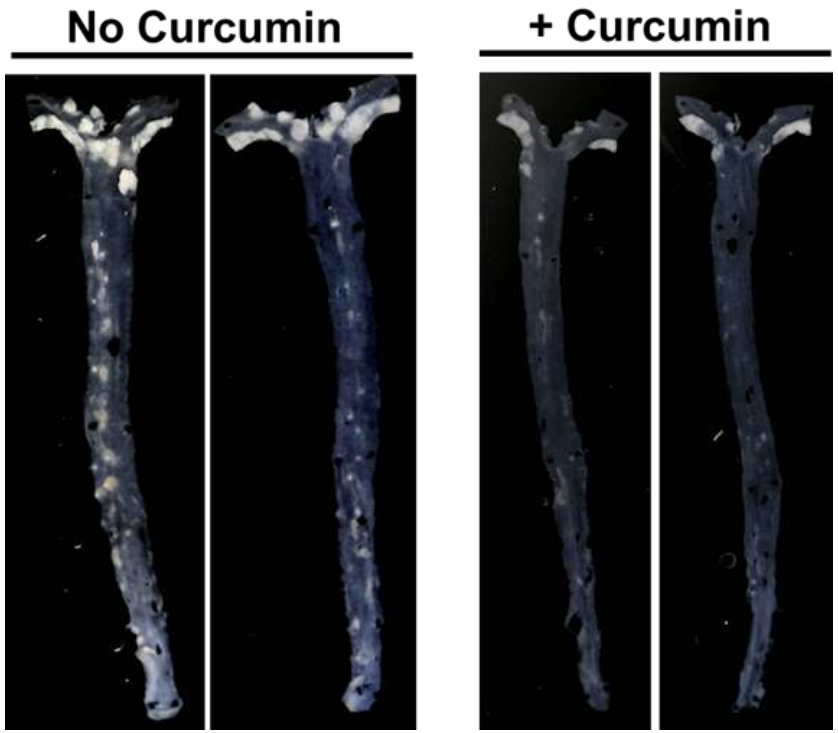
→ **Fed a High Fat High Cholesterol (Western Diet) for 16 weeks with or without oral curcumin**

→ **Perform Glucose Tolerance test to evaluate diabetes**

→ **Mice Sacrificed Evaluate Atherosclerosis**

Supplementation with curcumin attenuates Western Diet-induced Diabetes and heart disease





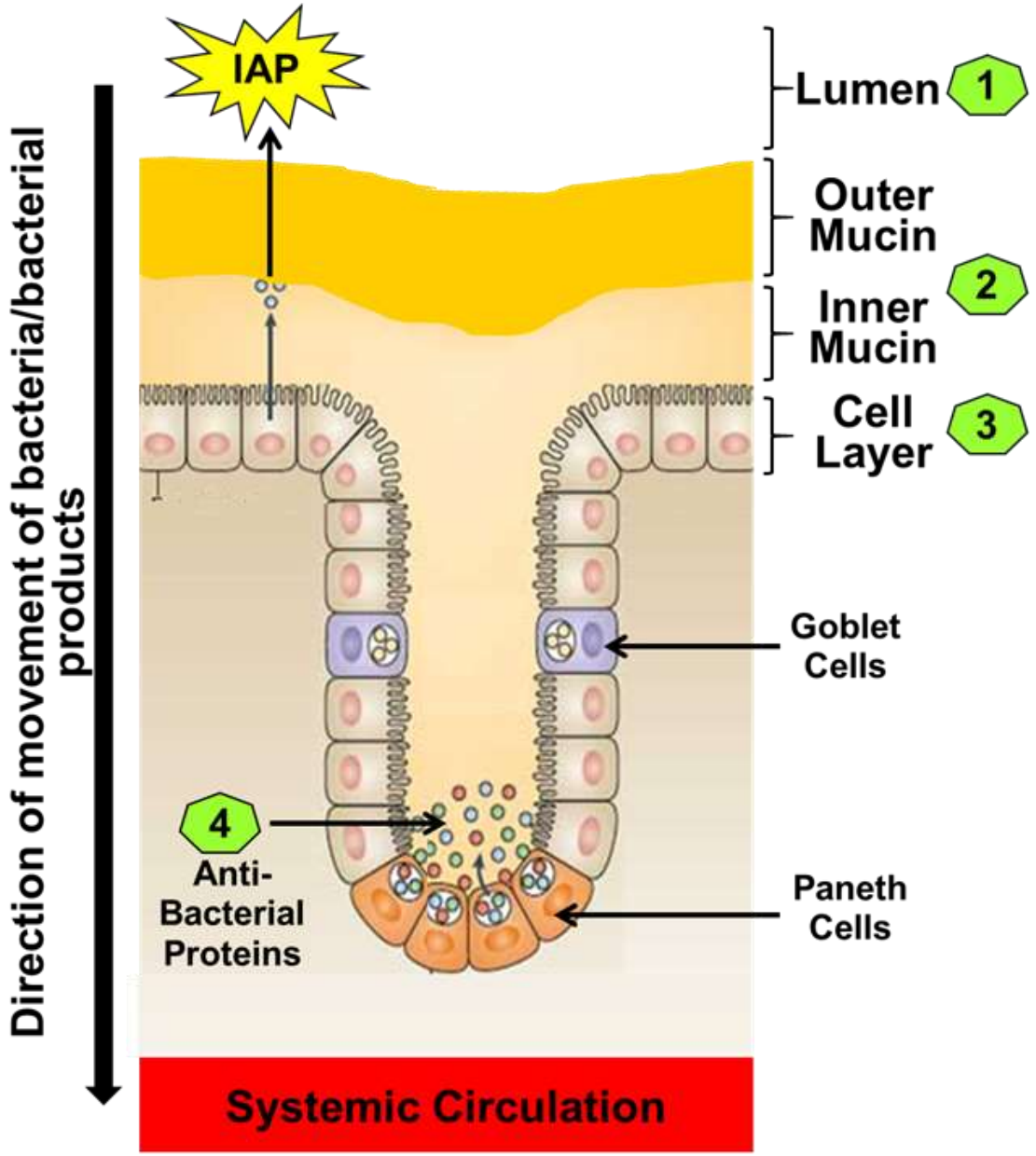
Ghosh SS et al. PLoS One. 9(9):e108577, 2014

One major problem

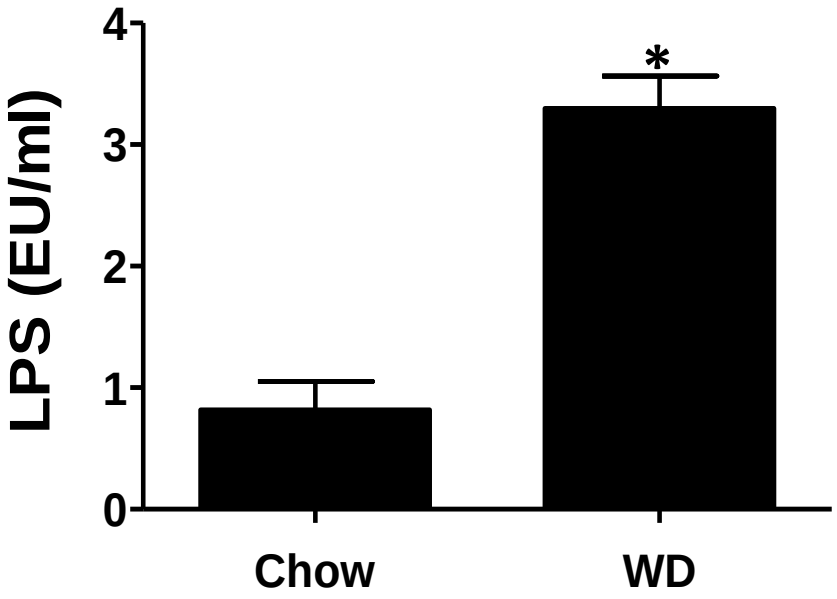
- Curcumin is very poorly absorbed – even after 8 g/day, only ng levels can be detected in the plasma
- Therefore, the **causal** role of curcumin has not been established by animal studies
- Most studies demonstrating beneficial effects of curcumin are performed using cells and these effects are observed with much higher concentrations of curcumin than can be detected in the plasma
- Efforts are, therefore, directed towards making more curcumin available to the target cells

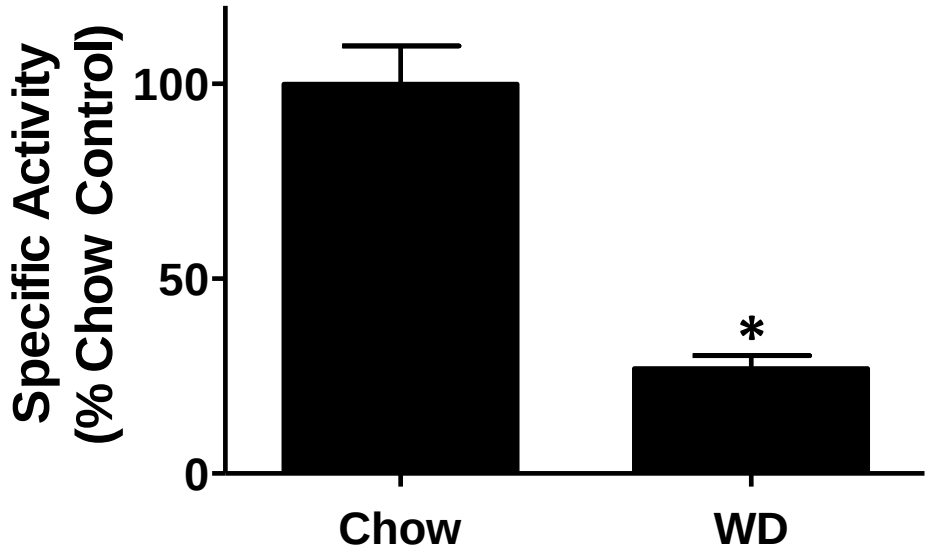
We hypothesized that curcumin may be acting in the intestine and therefore, its absorption may not be necessary

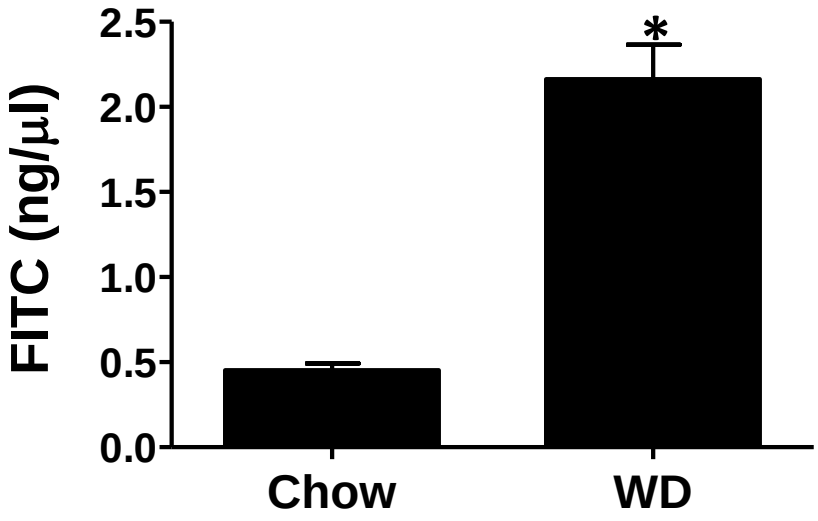
- Intestine contains millions of bacteria that produce toxins (LPS)
- Neither the bacteria nor the toxin is released into the circulation
- Intestinal wall regulates this process and provides a barrier
- If this barrier was not present, the amount of bacterial toxins in the gut are enough to kill a human being!!
- If the intestinal barrier is breached and the intestinal bacteria or the bacterial products are released into the circulation slowly, it will cause inflammation and result in the development of diseases such as diabetes or heart or kidney disease


IAP
Lumen
1
Outer Mucin
2
Inner Mucin
Cell Layer
3
Direction of movement of bacteria/bacterial products
Goblet Cells
4
Anti-Bacterial Proteins
Paneth Cells
Systemic Circulation

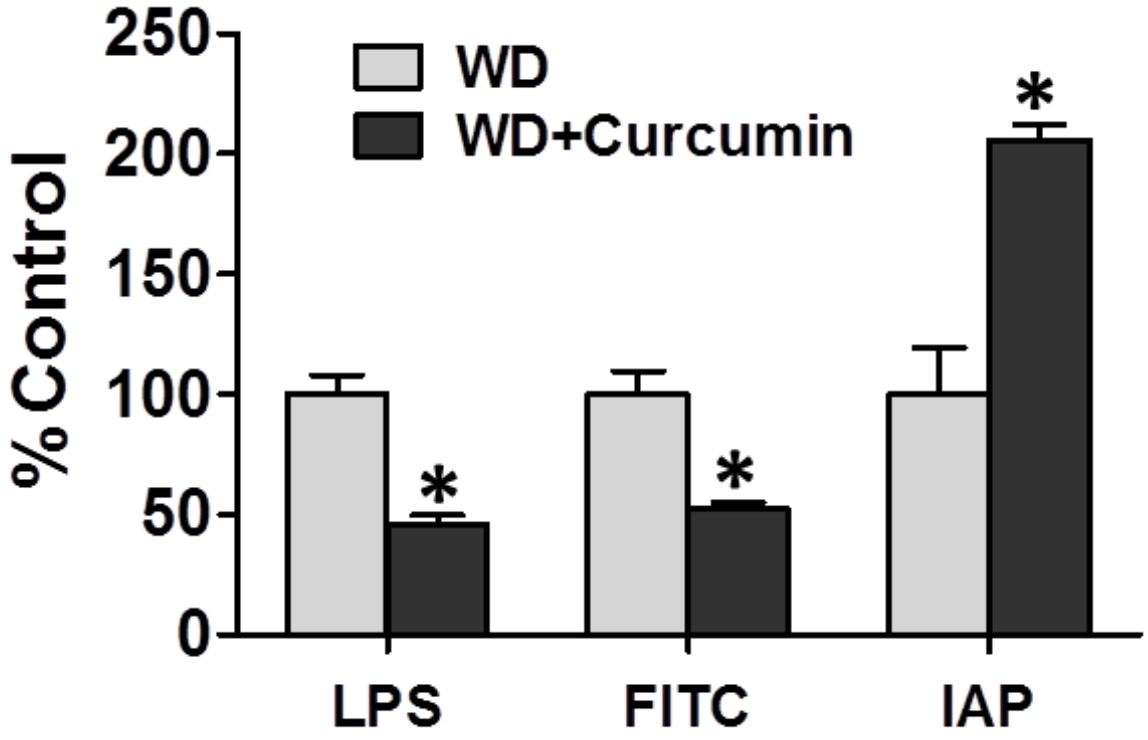
Western Diet feeding promotes translocation of bacterial toxin (LPS) to circulation



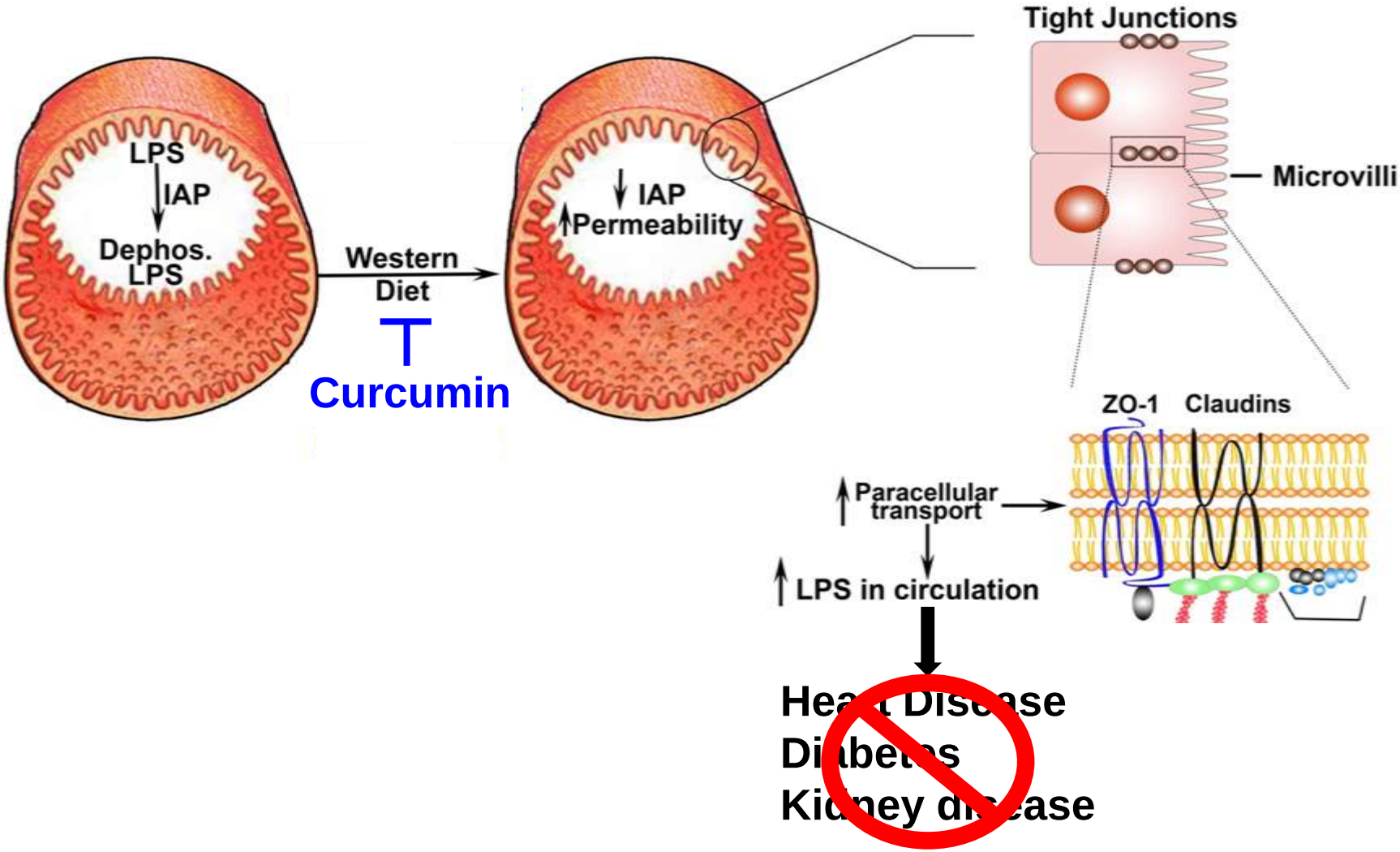




Supplementation with curcumin attenuates WD-induced increase in plasma LPS levels

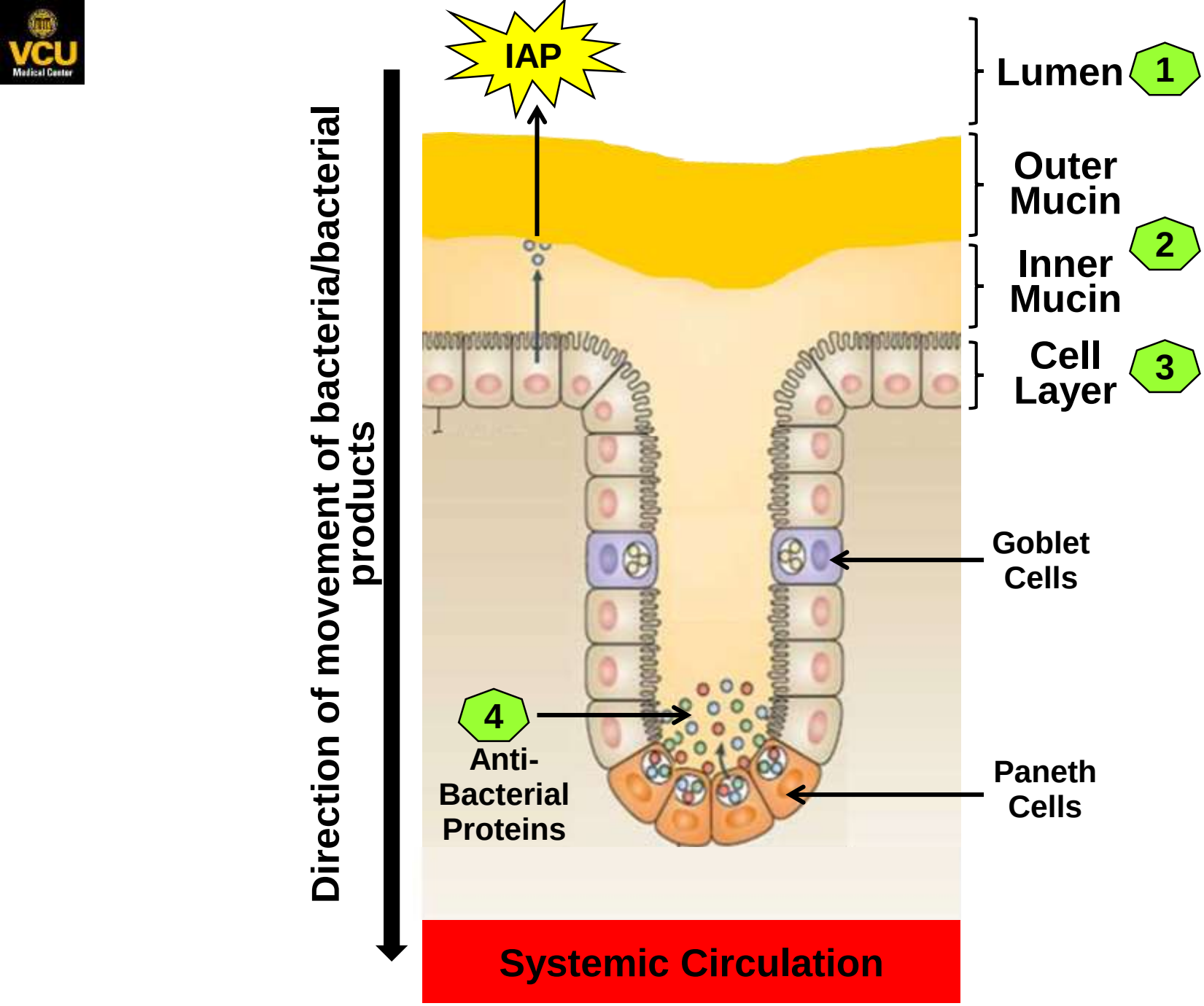


Proposed model for the action of Curcumin



PLoS One. 2014 Sep 24;9(9):e108577

Thank you for your attention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