

# THE EFFECT OF *Toxoplasma gondii* PROFILIN EXPOSURE ON HDL LEVEL IN *Rattus norvegicus* WISTAR STRAIN



Agustin Iskandar, Kaviyaranan Mohan, Sri Poeranto, Yulia Dwi Setia, Sudjari

**Faculty of Medicine Universitas Brawijaya  
Malang, East Java, Indonesia**

# INTRODUCTION - BACKGROUND

- In Indonesia, the national prevalence of obesity aged over 15 years is 10.3% in 2011 and the prevalence in women and men aged > 18 years in 2013 is 32.9% and 19.7%, respectively . (Indonesian Basic Health Research, 2013)
- Increased prevalence of obesity has led to some hypothetical explanations because lifestyle and diet modification do not fully explain the phenomenon.
- Some studies suggest that obesity is triggered by the presence of chronic inflammation which probably is a response to particular infection.(Milovanovic *et al.*,2009); (Portugal, 2008)

Asian Pac J Trop Biomed 2017; 7(2): 107–109

107

HOSTED BY



ELSEVIER

Contents lists available at [ScienceDirect](#)

Asian Pacific Journal of Tropical Biomedicine

journal homepage: [www.elsevier.com/locate/apjtb](http://www.elsevier.com/locate/apjtb)



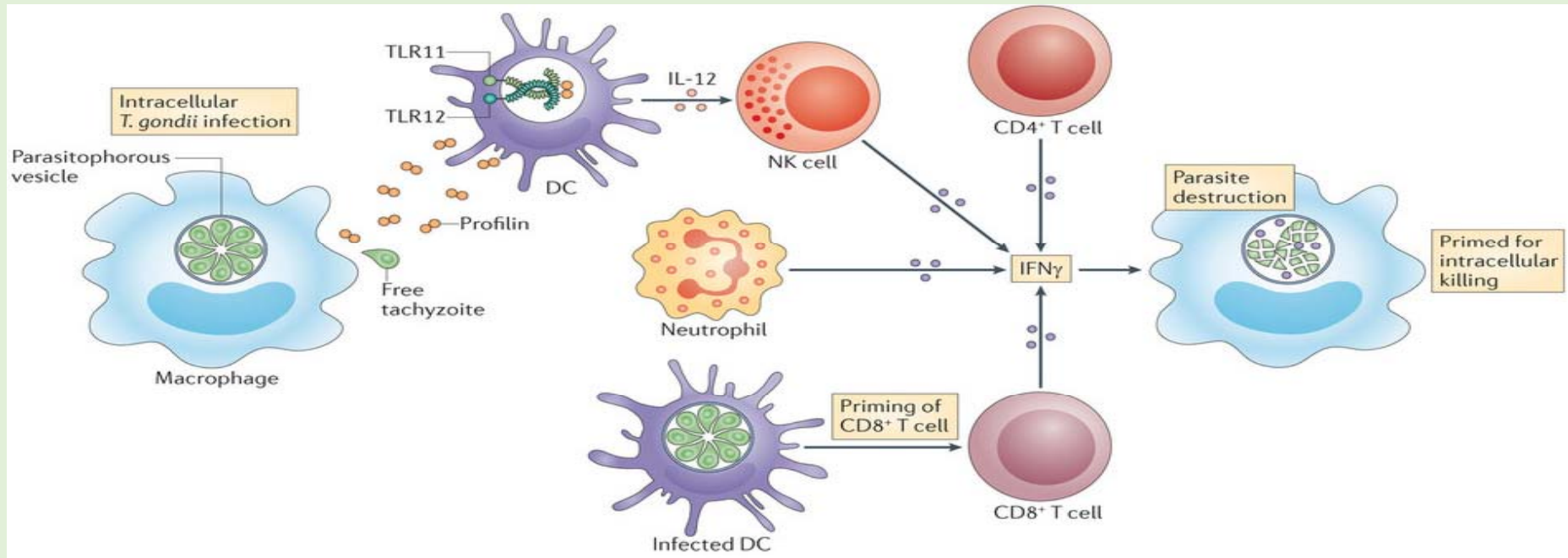
Original article <http://dx.doi.org/10.1016/j.apjtb.2016.11.017>

The level of chemerin and adipocyte fatty acid binding protein in *Toxoplasma gondii* seropositive obese individuals



Agustin Iskandar<sup>1,2\*</sup>, Karomah Sriwedari<sup>2</sup>, Indah Adhita Wulanda<sup>2</sup>, Muhammad Rasjad Indra<sup>3</sup>, Hartojo<sup>2</sup>, Novi Khila Firani<sup>4</sup>, Ery Olivianto<sup>5</sup>

<sup>1</sup>Department of Parasitology, Medical Faculty of Universitas Brawijaya, Malang, East Java, Indonesia



### ***T. gondii*, lipid metabolism and obesity**

- There is a possible association between *T. gondii* and obesity. (Reeves et al, 2013) Individuals with positive *T. gondii* serology had twice the odds of being obese compared to seronegative individuals.
- Host lipids have recently been implicated in the pathogenesis of *Toxoplasma gondii* infection. It has been shown that cholesterol uptake from the host plasma membrane is essential for parasite replication *in vitro*. (Milovanovic et al., 2009)

- *Toxoplasma gondii* has profilin-like protein which will be recognized by toll-like receptor (TLR-11) of the natural immune system and followed by inflammation of the host cell. (Hermes-Uliana et al, 2011)
- *T gondii* profilin have capability to bind with TLR-11 and cause an increase of inflammatory cytokine (TNF- $\alpha$ , IL-10, chemerin, aFABP) in adipocyte culture. (Sudjari et al, 2015)
- *Toxoplasma gondii* alters host cell metabolism for entry and replication and uses host metabolic products for its own metabolic pathways. (Portugal, 2008)
- A significant decrease in HDL and total Cholesterol was noted in infected *T gondii* mice at day 14 and persisted to day 42 . Conversely, LDL was increased at day 42. (Milovanovic, 2009)



Contents lists available at [ScienceDirect](#)

**Asian Pacific Journal of Tropical Disease**

journal homepage: [www.elsevier.com/locate/apjtd](http://www.elsevier.com/locate/apjtd)



Floral research

doi: 10.1016/S2222-1808(15)61028-3

©2016 by the Asian Pacific Journal of Tropical Disease. All rights reserved.

**The levels of *Toxoplasma gondii* profilin and adiponectin in obese patients complicated with or without metabolic syndrome as compared to non-obese patients**

Agustin Iskandar<sup>1</sup>, Muhammad Rasjad Indra<sup>2</sup>, Satuman<sup>2</sup>, Novi Khila Firani<sup>3</sup>, Titin Andri Wihastuti<sup>4\*</sup>

<sup>1</sup>Department of Parasitology, Faculty of Medicine, Brawijaya University, Malang, East Java, Indonesia

<sup>2</sup>Department of Physiology, Faculty of Medicine, Brawijaya University, Malang, East Java, Indonesia

<sup>3</sup>Department of Biochemistry, Faculty of Medicine, Brawijaya University, Malang, East Java, Indonesia

## Problem Statement

- Does *Toxoplasma gondii* profilin have effect on body weight and HDL level in *Rattus norvegicus* Wistar Strain?



## General Objective

- To reveal the effect of to *Toxoplasma gondii* profilin exposure on body weight and HDL level in *Rattus norvegicus* Wistar Strain

## Specific Objectives

- To know the bodyweight and HDL level in normal *Rattus Norvegicus* Wistar Strain
- To know the bodyweight and HDL level in *Rattus norvegicus* Wistar Strain given normal diet that are exposed to *Toxoplasma gondii* profilin.
- To know the bodyweight and HDL level in *Rattus norvegicus* Wistar Strain given hypercaloric diet that are exposed to *Toxoplasma gondii* profilin.

# Research Method

## Research Design

- The study was an experimental study

## Site/Time of Research

- The research was conducted in Laboratory of Pharmacology and Clinical Pathology , Faculty of Medicine, Universitas Brawijaya from January to April 2017

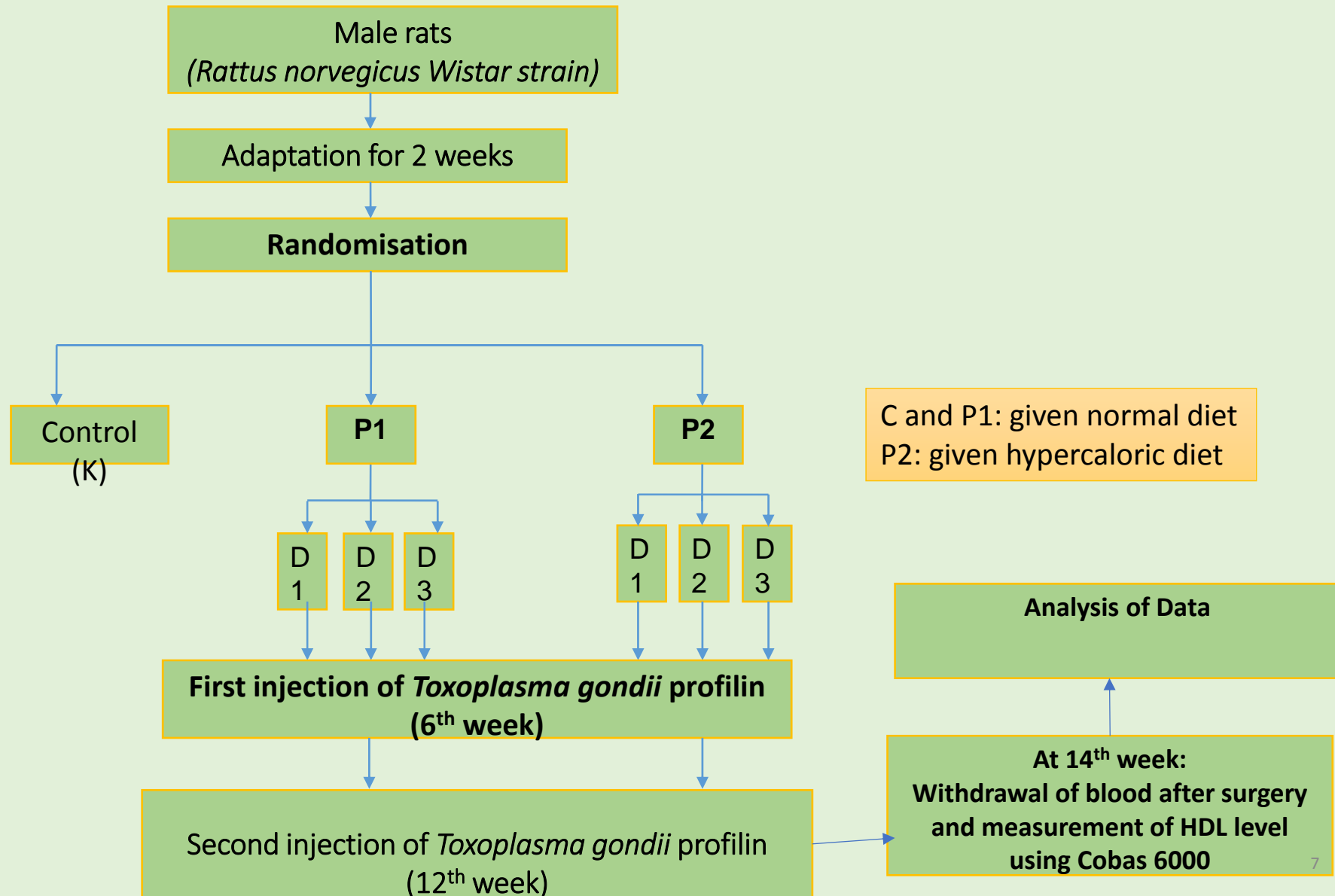
## Population and Sample

- Male, white *Rattus norvegicus* Wistar strain obtained from Parasitology Laboratory Medical Faculty of Brawijaya University.

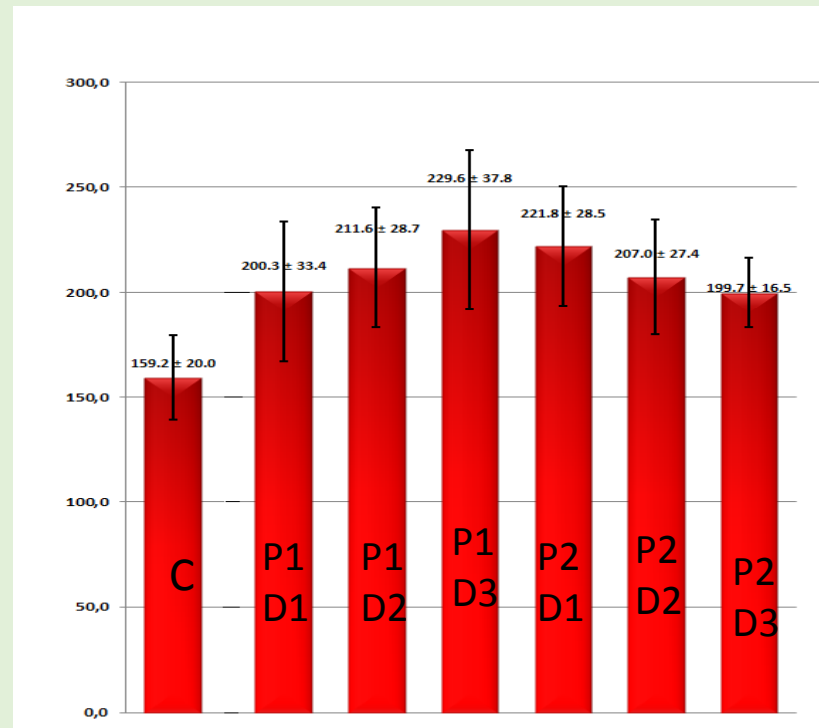
## Working Definition

- Profilin dose given based on preliminary study
- HDL was determined by using enzymatic method with Cobas 6000

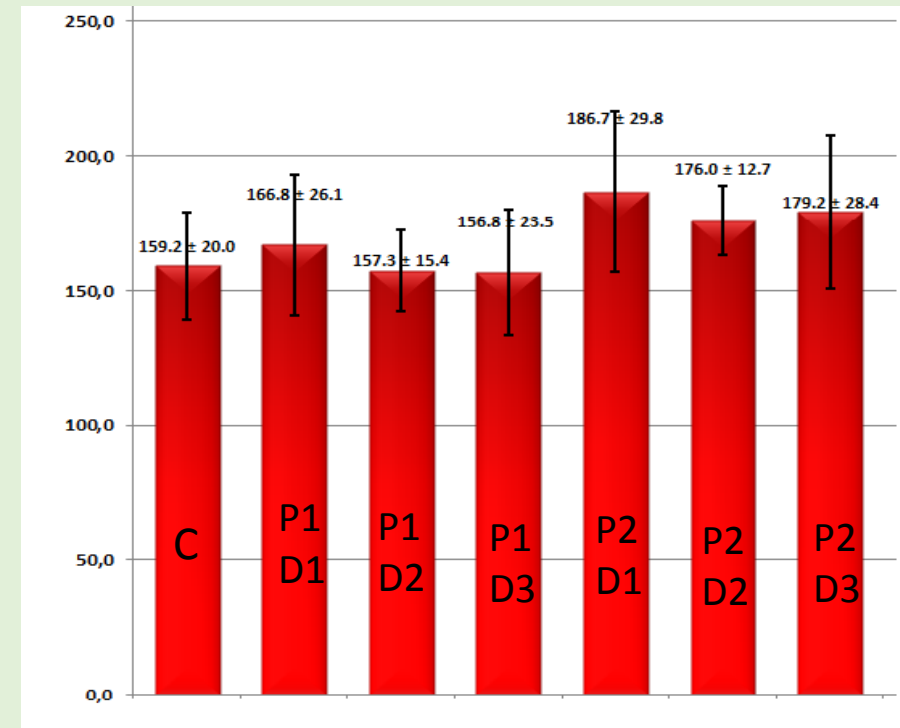
# STUDY FLOWCHART



# Results



Mean of body weight after once injection of *T gondii* profilin.



Mean of body weight after twice injection of *T gondii* profilin.



# HDL Level

Mean of Body weight after once injection of *T gondii* profilin

Group	HDL	Standard Deviation	p
K	36.0000	9.38083	0.07 ( $\alpha=0.05$ )
D1	54.0000	21.57159	
D2	46.0000	10.13246	
D3	49.0000	19.28730	
D4	40.8333	4.07022	
D5	46.1667	10.53407	
D6	40.1667	6.21021	

Mean of Body weight after twice injection of *T gondii* profilin

Group	HDL	Standard Deviation	p
K	36.0000	9.38083	0.252 ( $\alpha=0.05$ )
D1	46.4000	14.39792	
D2	37.0000	16.14001	
D3	34.2000	5.44977	
D4	43.2000	2.58844	
D5	49.4000	4.77493	
D6	43.2000	20.77739	

Note:

K: normal group; D1: normal diet + profilin 15ug/mL; D2: normal diet + profilin 30 ug/mL; D3: normal diet + profilin 45ug/mL; D4: hypercaloric diet + profilin 15ug/mL; hypercaloric diet + profilin 30 ug/mL; D6: hypercaloric diet + profilin 45ug/mL

# Correlation test

Correlation test		p	r	r <sup>2</sup>
Profilin dose and HDL level (Once injection)	Normal Diet	0.259	0.338	0.114
	Hypercaloric diet	0.257	-0.355	0.126
Profilin dose and HDL level (twice injection)	Normal Diet	0.072	-0.411	0.169
	Hypercaloric diet	0.341	-0.275	0.076
HDL level and body weight (Once injection)	Normal Diet	0.253	0.377	0.142
	Hypercaloric diet	0.246	-0.289	0.084
HDL level and body weight (twice injection)	Normal Diet	0.472	-0.201	0.040
	Hypercaloric diet	0.629	-0.136	0.185

# Discussion

## Effect of *T gondii* profilin exposure on body weight

- There is a significant difference of body weight after once injection of *T gondii* profilin, but no significant difference between 3 doses and also no significant difference after twice injection
- There was no significant correlation between profilin doses and body weight, the higher profilin doses the lower body weight
  - *T gondii* profilin could increase body weight, but still need further research to optimize dose and time of profilin injection.
  - upon infection with *Toxoplasma*, uptake of Chl from serum LDL by proliferating parasites triggers mobilization of Chl from the liver to the periphery.
  - Due to the use of Chl in peripheral tissues by *Toxoplasma*, less remains to be returned to the liver and thus decreased serum HDL.
  - The decrease at day 14 (but not at day 7) coincides with the time when the parasite burden has increased sufficiently to require significant LDL acquisition, measurable (in a host with low LDL and high HDL) only by HDL decrease, ([Milovanović et al., 2009](#)),

## Effect of *T gondii* profilin on HDL level

- There is no significant difference of HDL level neither once nor twice injection of *T gondii* profilin.
- No significant correlation between *T gondii* profilin doses and HDL level neither in normal diet nor hypercaloric diet.
  - *T gondii* altered lipid metabolism and decrease body weight, but it still need further research especially on the optimal dose for profilin injection and other factor?

## Correlation between body weight and HDL after injection of *T gondii* profilin.

- There was no significant and very weak correlation between body weight and HDL level neither in once nor twice injection.
  - The role of *T gondii* profilin on body weight need further research,
  - It can be postulated that profilin cause obesity and adipocyte dysfunction but didn't altered lipid metabolism → other ways?

# Conclusion & suggestions

## CONCLUSION

- The normal diet + twice injection of *T gondii* profilin 45 µg/mL, has the lowest average weight.
- The normal diet + once injection of *T gondii* profilin 45 µg/mL, has the highest average weight
- The normal diet + twice injection of *T gondii* profilin 45 µg/mL, has the lowest average HDL level
- The normal diet + once injection of *T gondii* profilin 15 µg/mL, has the highest average HDL level
- No significant difference and correlation between doses and body weight also HDL level both once and twice injection of *T gondii* profilin.

## SUGGESTION

- Further research by injection of *Toxoplasma gondii* (not only profilin of *T gondii*) to make sure that there was relationship between *T gondii* infection and obesity.



# UNIVERSITAS BRAWIJAYA

WORLD CLASS ENTREPRENEURIAL UNIVERSITY

# Thank You



