Professor Dr.Prasert Na Nagara Thesis Awards, Academic Year 2025

Good Thesis Awards

Biological Science Section

Doctoral Degree Program

Dr. Chularat Hlaoperm

Major in Animal Health and Biomedical Sciences

Characterization of Mushroom Extract and Synthesis Compounds for Anti-Inflammatory and Immunomodulatory Activities on Peripheral Blood Mononuclear Cell (PBMC) against Feline Coronavirus inhibiting Corona Virus in Cats

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Abstracts

Feline infectious peritonitis (FIP) is a progressive and often fatal disease involving viral replication and immune dysregulation. This study investigated the antiviral and immunomodulatory potential of *Phallus indusiatus* (*P. indusiatus*) against FIP. Among 17 mushroom extracts, *P. indusiatus* showed the strongest FIPV Mpro inhibition (69.2%). At a non-cytotoxic concentration of 19 µg/mL, it reduced nitrite, IL-1β, and IL-10 in healthy PBMCs and significantly decreased IL-1β and IFN-γ in FIP-derived PBMCs. PBMCs isolation and culture from FIP-associated effusions were successfully established. Overall, *P. indusiatus* demonstrated dual antiviral and immunomodulatory activities, supporting its potential as an adjunctive candidate for FIP management.

Introduction

FIP is a life-threatening disease caused by feline coronavirus (FCoV), involving viral replication and dysregulated immune responses that lead to severe inflammation and vasculitis. Although antiviral therapies are available, relapse and drug resistance remain concerns. *P. indusiatus,* an edible medicinal mushroom, has demonstrated antiviral and immunomodulatory properties, making it a promising candidate for further investigation in FIP.

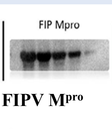
Objectives

To evaluate the effects of mushroom extract on IL-10, IL-1β, and IFN-γ in PBMCs from healthy cats and FIP-associated effusions.

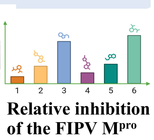
Materials and Methods



1. Screening → 17 types of mushroom



FIPV M^{pro}



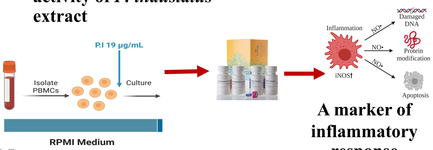
Relative inhibition of the FIPV M^{pro}

Crude extract

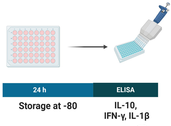


Phallus indusiatus (P.I)

2. Nitrite scavenging activity of *P. indusiatus* extract



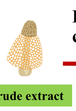
Anti-inflammatory cytokines(IL-10)



3. ELISA



Pro-inflammatory cytokines (IL-1β, IFN-γ)



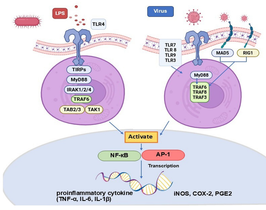
Crude extract (P.I)

Bioactive compounds → STITCH 5.0 database → LC-MS/MS

Inflammation model

1. PBMCs isolation from whole blood +Lipopolysaccharide (LPS)

2. PBMCs isolation from FIP fluid ≠ LPS



Results

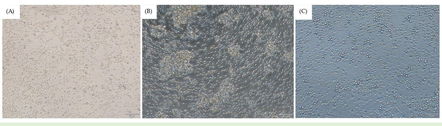


Fig.1 PBMC morphology from whole blood and FIP fluid: healthy cells (A, C) and unhealthy cells with irregular shape, debris, and platelet clumping (B).

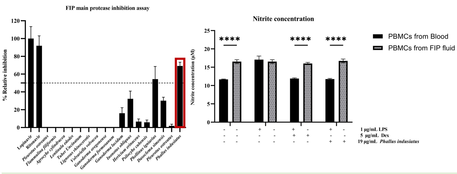


Fig.2 *P. indusiatus:* 69.2% FIPV Mpro inhibition vs. ritonavir (91.9%) and lopinavir(98.1%) (A). Greater NO suppression in whole-blood PBMCs than FIP-fluid PBMCs (B)

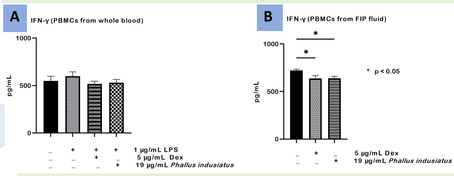


Fig. 3 A. LPS did not induce IFN-γ in whole-blood PBMCs. B. Dexamethasone and *P. indusiatus* significantly reduced IFN-γ in FIP-fluid PBMCs.

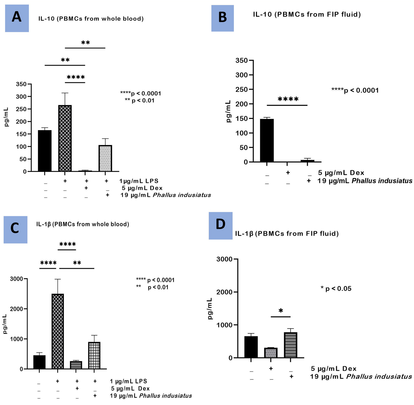


Fig. 4 The extract significantly reduced IL-10 (A, B) and IL-1β (C, D) levels in PBMCs from whole blood and FIP fluid.

Conclusion

***P. indusiatus* -Antiviral & Immunomodulatory Activities**

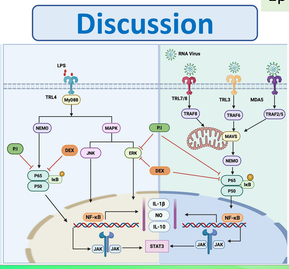
-FIPV Mpro inhibition: 69.2%

- Reduced NO production in LPS-stimulated PBMCs from healthy cats

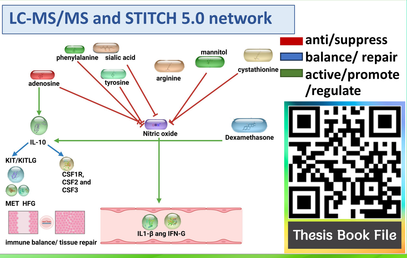
-Reduced IFN-γ in FIP-fluid PBMCs

- Reduced IL-1β and IL-10 in PBMCs from whole blood and FIP fluid

Discussion



LC-MS/MS and STITCH 5.0 network



Thesis Book File