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October 15-17, 2016
Semarang, Indonesia



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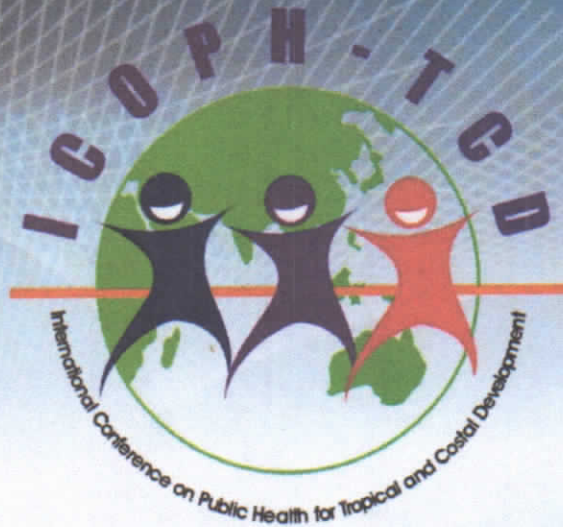
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ABSTRACT BOOK

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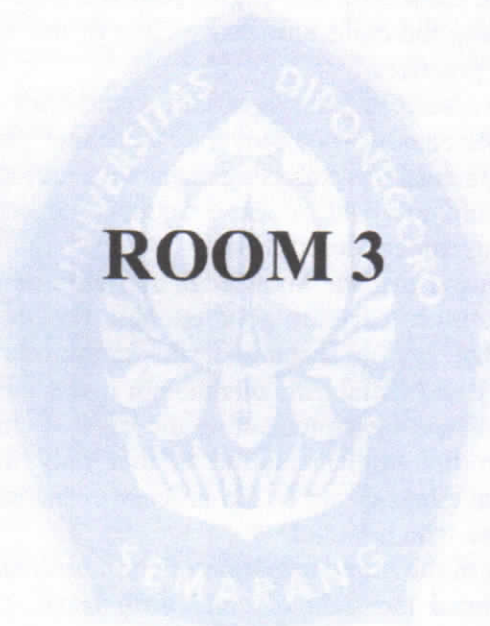
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**REDUCE SPLEEN-IFN- γ CORRELATED WITH CXCL9 LEVELS
DURING CEREBRAL MALARIA PHASE IN ANNONA
MURICATA-TREATED SWISS MOUSE STUDY**

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Abstract

Background: Cerebral malaria (CM) cause malaria mortality. Anti-plasmodial and immunomodulatory properties of *A. muricata*-leaf extract (AME) may provide benefices for CM-patients. IFN- γ , a pivotal cytokine in the CM-immunopathology, is modulated by CXCL9, IL-10 and IL-12. The aim was to determine factors correlated with spleen-IFN- γ production in healthy and CM phase with/without ethanolic AME treatment.

Method: A post-test only control group design study using 36 swiss mice randomly divided in 6 groups was performed. The *Plasmodium berghei* ANKA (PbA)-inoculated and healthy mice were grouped in C(+) and C(-). The healthy mice treated with AME 100 and 150 mg/Kg BW/day were grouped in X1 and X2. The PbA-inoculated and received either AME dose were grouped in X3 and X4. Phytohemagglutinin (PHA) induced spleenocyte IFN- γ production, while lipopolysaccharide (LPS) induced IL-10, IL-12 and CXCL9. Elisa was used to measure the observed cytokine production. One-way ANOVA and post hoc test were done in normally distributed data; otherwise Kruskal-Wallis and Mann-Whitney test were used.

Results: IFN- γ were significantly lower in C(+), X3 and X4 than C(-) group, and this was also observed in CXCL9. IL-10 were significantly higher in X3 and X4 than C(+) group ($p=0.003$ and $p=0.004$). IL-12 were not different among all six groups ($p=0.071$). Spearman correlation test showed a correlation between IFN- γ and CXCL9 produced during CM-phase regardless AME treatment ($r=0.581$; $p=0.009$), while IFN- γ was correlated with IL-10 levels in healthy groups with/without AME treatment ($r=0.544$; $p=0.029$).

Conclusion: The conclusions were the reduce spleen-IFN- γ production might regulate differently in healthy and CM phase

Keywords: *Annona muricata*, cerebral malaria, IFN- γ , CXCL9.

**ANNONA MURICATA ASSOCIATED WITH INCREASE-
PHYTOHEMAGLUTIN INDUCED SPLEEN IL-10 PRODUCTION
OF SWISS MICE DURING CEREBRAL MALARIA PHASE**

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Abstract

Background: Cerebral malaria (CM) prompts patient death. *A. muricata*-leaf extract (AME) having anti-plasmodial and immunomodulatory properties may provide advantages for malaria-endemic communities. Anemia during CM-patients is possibly due to reduce interleukine (IL)-10, and increase macrophage migration inhibitory factor (MIF) production which interfere erythropoiesis. The objective was to determine whether AME influenced spleen-IL-10 and MIF production during CM-phase which then increased Hb or erythrocyte counts.

Method: A post-test only control group design study was done by using 30 swiss mice which were randomly divided in 6 groups. The C(+) and C(-) groups were *Plasmodium berghei* ANKA (PbA)-inoculated and healthy-mice. Healthy-X1 and X2 groups received ethanolic-AME 100 and 150 mg/Kg BW/day. PbA-inoculated X3 and X4 groups received either AME dose. IL-10 and MIF produced by splenocytes stimulated with phytohemagglutinin (PHA) or lipopolysaccharide (LPS) *ex-vivo*, were measured by Elisa. Hb and erythrocyte counts were measured by automatic haematology analyzer.

Results: IL-10 was tested by Kruskal-Wallis ($p < 0.0001$), then Mann-Whitney showed a significantly higher IL-10 of X3, X4 than C(+) group ($p = 0.003$ and $p = 0.017$). PHA and LPS-induced splenocyte MIF production were tested by One-way ANOVA and Kruskal-Wallis ($p = 0.176$ and $p = 0.413$). Mann-Whitney test showed a lower Hb of C(+), X3 and X4 than C(-) groups ($p = 0.045$, $p = 0.038$, and $p = 0.016$). Erythrocyte counts were not different among 6 group studied ($p = 0.072$). IL-10 and MIF had no correlation with Hb or erythrocyte counts during CM-phase. The conclusion is that AME associates with increase spleen-IL-10 production during CM-phase. The spleen-IL-10 and MIF might not influence Hb and erythrocyte counts during CM-phase.

Conclusion: AME associates with increase spleen-IL-10 production during CM-phase. The spleen-IL-10 and MIF might not influence Hb and erythrocyte counts during CM-phase.

Keywords: *Annona muricata*, cerebral malaria, MIF, IL-10.