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Robusta Coffee Beans Increased Level Of IL-1β (Interleucine-1β) Monocytes Against To Streptococcus mutans In Vitro

By:
Roedy Budirahardjo [1], Pujiana Endah Lestari [2], I Dewa Ayu Ratna Dewanti [3].
Department of Pedodontia [1] ,Department of Biomedical Science [2.3]. Faculty of Dentistry, Jember University

Correspondence: I Dewa Ayu Ratna Dewanti FKG Univ. Jember. Jl. Kalimantan 37 Jember. No HP. 081249450970.
Email idewadewanti@yahoo.com

ABSTRACT

Introduction.
Several studies have proven that coffee beans can inhibit S. mutans growth. Coffee beans suspected potentially influence immune response to S. mutans. The immune response to S. mutans among others fagositosis, IL-1β, IL-1α and TNF-α. Purpose this result is analyzing modulation of IL-1β robusta coffee beans against S. mutans.

Method.
Peripherial blood sampling of healthy people as much as 6 cc then mixed with anticoagulants (heparin). Ficoll-Hypaque centrifugation were suspended in medium RPMI 1640. The cells are placed on a microtiter plate and washed 4 times with medium. Furthermore monocytes obtained treated in accordance groups. The control group (K): untreated. KP1: monocytes + S. mutans. KP2: monocytes + coffee 2.5% + S. mutans. KP3: monocytes + Coffee 5% + S. mutans, KP3: monocytes + Coffee 10% + S. mutans. After incubated 24 hours. Supernatant was taken for analysis of IL-1β by ELISA technique. Data were analyzed using ANOVA followed by LSD test.

Results.
There were significant differences across all study groups. Robusta coffee beans steeping most increased level of IL-1β, where the higher the concentration, the more elevated the levels of IL-1β.

Conclusion.
Robusta Coffee Beans Steeping Increased Level Of IL-1β monocytes against to Streptococcus mutans in vitro.

Keywords: coffee beans ; dental caries ; S. mutans ; IL-1β

INTRODUCTION

Coffee plant is one of the leading commodities developed in Jember, Rolas coffee beans are coffee products produced by PTP XII Jember. Research aproved that coffee prevents gallstones, improves memory, prevents diabetes, prevents cancer, overcomes depression, increases metabolism.[1.2.3] Coffee beans content such as flavonoids, xanthine can serve as anti-inflammatory, antibacterial diteliti.[4.5.6] Therefore, coffee is expected to provide a solution as an immunomodulator against dental caries. Currently immunomodulator is a topic of conversation in the world of health is used as a prevention or treatment of various diseases. The dental caries immune response such as phagocytosis, IL-1β, IL-1α, and TNF-α. On the other hand caries should be prevented and resolved because it is the most common dental disease encountered with the main cause of Streptococcus mutans. It is said that Bacteria excretes virulence media associated with extracellular protein immunomodulators (VIPs, which have mitogenic effects on lymphocytes, suppresses immune response from the host and induces IL-10 production, which is an immunosuppressor cytokine.) Thus, VIP is an important virulent factor for the microorganisms produced and Is closely related to bacterial pathogenicity.[7.8] Streptococcus mutans are members of oral microbiota involved in dental caries and infective endocarditis. To adapt to the environmental stresses facing host defenses, these bacteria use a two-component system, which modulates global changes in gene expression. These include VicRK and CovR systems. S. mutans will interact with mononuclear and phagocyte polymorphonuclear (PMN).[9] Phagocytosis may be affected by the role of IL-1β.

Several studies have proven that coffee beans can inhibit S. mutans growth. Coffee beans suspected potentially influence immune response to S. mutans. Coffee inhibition zone against to S. mutans. Thus it is said that coffee is thought to inhibit dental caries by means of modulating the immune response). Namboodiripad, K. Srividya (2009) proves the existence of coffee resistance zones against S. mutans.[9.10] These bacteria are structurally and antigenetically express surface proteins called antigen I / II, B, Sr and PAc which have a molecular weight of 185 kDa. This antigen by the investigators is determined to play a role in the pathogenesis of dental caries, and is effective as a vaccine in the prevention of dental caries. The antigen I / II S. mutans has adhesive properties, when the bacteria attach to the host component during colonization and infection to become Focus a number of researchers. These surface protein antigens have an effect

on the attachment of S. mutans with acquired pellicles on tooth surfaces.[11] Aim this study was analyze modulation of IL-1β robusta coffee beans against S. mutans.

METHOD

Seduhani coffee used in this research is coffee steeped from coffee powder Rolas PTP XII production area Jember East Java. The steeping coffee made by brewing the coffee beans was mashed with hot water (20 g in 200 ml), to a concentration of 10%. Further concentration 5% and concentration of 2.5%. Initially, isolation and culture of monocytes were performed. Peripherial blood collection of healthy people as much as 6 cc then mixed with anticoagulant (heparin). Ficoll-hypaque centrifugation and suspended in a RPMI 1640 medium. The cells were placed on a 96-well microtiter plate of 8 x 105 cells / well for 45 minutes 37 ° C and washed 4 x with medium. The inherent cells were monocytes. Furthermore, monocytes were cultured and treated accordingly. Control group (K): untreated KP1: monocytes + S. mutans. Treatment group: KP2: monocytes + S. mutans + the steeping coffee beans 2.5% + S. mutans coffee. KP3: monocytes + the steeping coffee beans 5% + S. mutans, KP3: monocytes + βthe steeping coffee beans 10% + S. mutans. Furthermore, the supernatant was taken for the analysis of IL-β by ELISA technique. The supernatant was coated on the base of the microtiter plate (92 well). After washing, reacted with anti-TNF-α 1 (anti human) antibodies. It was then reacted with a secondary antibody labeled a color degrading enzyme and reacted with a chromogenic substrate. The product formed is measured absorbance using ELISA reader. Data were analyzed using ANOVA followed LSD.

Results

Figure 1 show that the control group (K) there is an active monocyte cell that produces IL-1β, the KP1 group (S.mutans) is shown to be higher. KP2, KP3, KP4 exposed to steeping coffee beans showed higher levels of IL-1β (the higher the concentration, the higher the levels of IL-1β).

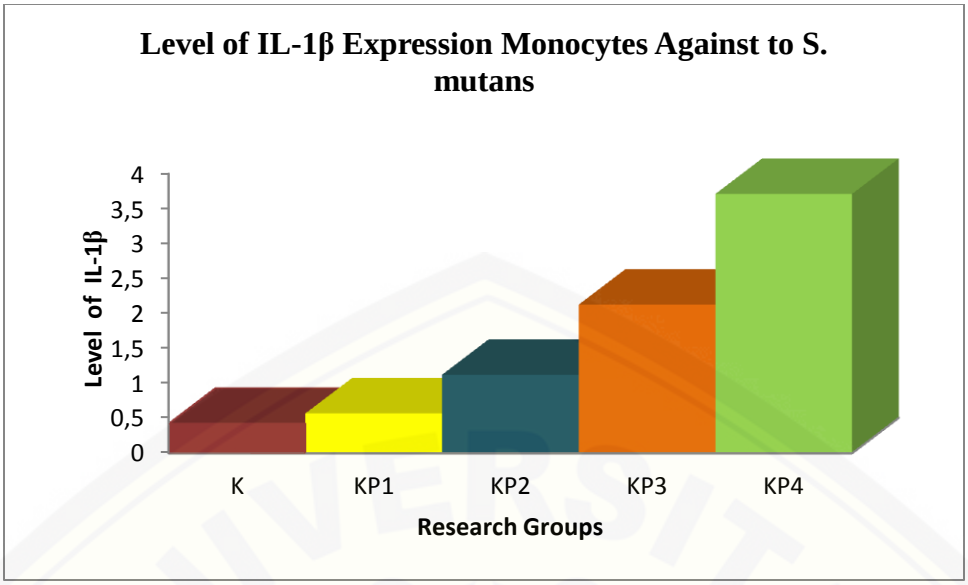

Figure 1. Bart chart of Level of IL-1β Monocytes against to S. mutans.

Discussion

The control group showed that IL-1β levels meant that monocyte cells were actively producing IL-1β. The KP1 group (S.mutans) appears to be higher than the control, meaning that when an infection occurs (S. mutans), it responds by producing IL-1β. KP2, KP3, KP4 exposed to steeping coffee beans showed higher levels of IL-1β (the higher the concentration, the higher the levels of IL-1β). This is allegedly caused by the chemical content in the steeping of the coffee beans.

The flavonoid content is known to act as an immunomodulator. In studies of other natural ingredients that contain flavonoids have the ability to improve the immune system. A study of the function of in vivo cellular immunity in mice proves that flavonoid compounds can stimulate lymphocyte proliferation, increase T-cell count and increase IL-2 activity. Flavonoids potentially work against lymphokines produced by T cells that will stimulate phagocyte cells including monocytes to perform phagocytic responses.[12] Monocytes have receptors that can recognize S. mutans. Bacterial attachment through multiple binding sites due to lectinlike interactions, ie proteins present on the surface of S. bacteria.

Cell resistance to S. mutans by synthesizing various pro-inflamatoy cytokines and expressing leukocyte adhesion molecules. Pro-inflamatory mediators will activate leukocytes to help the body's defense system where one of the leukocyte cells that play the most is monocytes.

Monocytes hold resistance against S. mutans. Subsequently producing endotoxin, making inflammatory cells including monocytes release cytokines such as IL-1β.[13]

Conclusion

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