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The Angiogenic Activity of α-Mangostin in the Development of Zebrafish Embryo In Vivo

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Abstract : Angiogenesis is the process of generating new capillary from pre-existing blood vessels. VEGFA is a major regulator in angiogenesis that binds and activates two tyrosine kinase receptors, VEGFR1 (Flt-1) and VEGFR2 (Flk-1/KDR) which regulate pathological and physiological angiogenesis. Disruption of VEGFA and VEGFR2 regulation lead to many diseases. The study of α-Mangostin (derivate of xanthone) as anti-oxidant and anti inflammation has been explored recently and both of them have relation to vasculature however the effect of α-Mangostin in blood vessel formation in healthy tissue in vivo has not been studied. Zebrafish is a powerful model in studying angiogenesis and shared many advantages that is a viable whole animal model for screening small molecules that affect blood vessel formation. Therefore the aim of this study is to evaluate angiogenic activity of α-Mangostin in healthy tissue in vivo in zebrafish embryo in relation of patterning blood vessel. Blood vessel patterning is highly characteristic in the developing of zebrafish embryo and the subintestinal vessel (SIV) can be stained and visualized microscopically as a primary screen for α-Mangostin that effect angiogenesis. The zebrafish embryos are divided into 2 groups. Group one consists of the zebrafish embryos at 1 dpf for 4 days which are tested to α-Mangostin in several concentration 2 µM, 4 µM, 6 µM, 8 µM and 10 µM whereas in group two the zebrafish larva at 4 dpf are exposed to α-Mangostin 1,75 µM, 2,3 µM, 2,9 µM, 3,8 µM dan 5 µM for 2 days. DMSO is served as a control for each group. The level expression of vegfa and vegfr2 are observed quantitatively using real time q-PCR and patterning of SIV are then analized via alkaline phospatase staining. Result shows that the level expression of vegfa and vegfr2 is repressed quantitatively as shown in real time q-PCR in the group of 1-4 days of α-Mangostin exposure where it is increased in the group of 4-6 days of α-Mangostin exposure. The result is then compared to alkaline phospatase staining of SIV using stereo microscope. It indicates that α-Mangostin does not disturb the patterning of SIV formation in zebrafish.

Keywords : angiogenesis, Danio rerio, α-Mangostin, SIV, vegfa, vegfr2
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