

Curcumin Promotes the Deoxygenated State of Hemoglobin

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Abstract : Introduction: In beta-thalassemia, an imbalance in the production of beta subunits of hemoglobin leads to the oxidation and deposition of excess alpha-globin chains at the cell membrane, resulting in the hemolysis of erythrocytes and a disorder of erythropoiesis. Antioxidants, such as curcumin, may promote this progression. This study aims to investigate the antioxidant effect of curcumin on hemolysate samples from patients with beta-thalassemia. Materials and methods: Pure curcumin was extracted and purified for use in studying its effect on the visual light absorbance of hemoglobin in hemolysate samples from beta-thalassemia patients compared to control samples. Changes in light absorbance at 540 and 700 nm wavelengths during exposure to curcumin were analyzed to examine the shift from oxyhemoglobin to deoxyhemoglobin. Results: Curcumin was found to dissolve rapidly and to a high degree in ethanol at 1 mg/ml, but did not dissolve in distilled water at the same concentration. The curcumin addition to the hemolysate sample of a patient with beta-thalassemia resulted in a decrease in the light absorbance of the sample at 540 nm wavelength, with minimal changes observed in the control sample. Conclusion: Curcumin deoxygenated the hemolysate samples from both the patient and control, causing hemoglobin precipitation to occur slowly. The study suggests a greater potential role for curcumin in deoxygenating hemoglobin in the hemolysate samples of beta-thalassemia patients compared to those of the normal control.

Keywords : beta-thalassemia, hemoglobin, curcumin, alpha-globin

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