中文題目：一氧化氮的生成影響紅血球氧氣結合

英文題目：Effects of NO Donor on Erythrocyte Oxygen Loading by Raman Microspectroscopy

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前言：In critical care, an important indicator of disease or dysfunction in erythrocyte is the $O_2$ storage capacity. Resonance Raman microspectroscopy is a particular sensitive probe for studying the electronic and structural properties of metalloporphyrin complexes including hemoglobin. We present Raman miccrospectroscopy and images of functional erythrocytes in oxygenated state ($HbO_2Sat$) and containing methemoglobin (metHb).

材料及方法：The oxygenation processes of human erythrocyte is monitored using a Raman microspectrooscopy and imaging techmipue. Raman images of the 1638 $cm^{-1}$ band are record in the oxygenated and deoxygenated state using only 120s of laser exposure and ~1 mW of defocused laser power. All approaches used to calculate intensity resulted in significant correlation ($r>0.9$, $p<0.01$) between $HbO_2Sat$ values measured the oximeter and $HbO_2Sat$ estimated from Raman spectra. Successive determinations of $HbO_2Sat$ in a given area of constant oxygen level provided results varying ±1-6%. The detection of all physiological $HbO_2Sat$ levels was possible. Methemoglobin record images of an erythrocyte with nitroprusside or nitroglycerin using 880 $cm^{-1}$ excitation and an integration time of 480s. MetHb is in the ferric high-spin state therefore cannot bind $O_2$. The 880 $cm^{-1}$ excitation spectrum of metHb encapsulated in a single living cell prepared. The result provide a molecular insight into the dynamical nature of the reverse oxygenated hemoglobin and metHb changing throughout the effect of oxidative stress in erythrocytes and the effects of drugs designed to decrease oxygen affinity in the treatment of such conditions as nitroglycerin and nitroprusside.

結果和結論：The results of this study successfully employed and gained by in vivo single erythrocyte molecular analysis have important ramifications to understanding of fundamental physiological processes and have important implications for the potential biomedical application of Raman imaging and spectroscopy in the diagnostic and analytical tool in erythrocyte disorders.