

## Circulatory Histidine levels for the assessment of disease activity in Takayasu arteritis: A targeted NMR based serum metabolomics study

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### Abstract

**Background:** Quantitative assessment of disease activity is important for effective disease management in Takayasu arteritis (TA) which is an immune-mediated inflammatory disease. The dominance of oxidative stress is the hallmark of active inflammation. Both clinical and preclinical data suggest that histidine has its strong anti-oxidative and anti-inflammatory effects [1,2]. Based on this, we hypothesized that the circulatory Histidine can serve as an indicant of active inflammation and so for monitoring disease activity in TA.

**Objective:** The aim of present study was to perform reliable estimation of circulatory levels of histidine and further to evaluate its potential in diagnostic screening of active and inactive TA patients.

**Methods:** The serum samples were collected from 98 TA patients fulfilling American College of Rheumatology (ACR) criteria and 77 normal controls (NC). The 1D <sup>1</sup>H CPMG NMR spectra recorded on each serum sample at 800 MHz NMR spectrometer. The resulted spectra were processed and concentrations of Histidine were estimated (w.r.t formate as an internal reference) using NMR Suite of software program CHENOMX. The statistical significance was considered at p-value  $\leq 0.05$ .

**Results:** According to Indian Takayasu Clinical Activity Score (ITAS) combined with acute phase reactant-erythrocyte sedimentation rate [ITAS-A (ESR)], 45 patients (46%) were clinically active, whereas 53 patients (54%) patients were inactive. Circulating levels of histidine were significantly decreased in active TA patients compared to both inactive TA patients and NC, whereas, there was no statistically significant difference between Inactive TA and NC. Further, the receiver operating characteristic (ROC) curve analysis was performed to assess the diagnostic potential of Histidine and yielded satisfactory sensitivity and specificity with AUROC equal to 0.65 [95% CI=0.54-0.76]. The circulatory levels of Histidine correlated well the erythrocyte sedimentation rate ( $r = -0.19$ ,  $p < 0.075$ ) and with the C-reactive protein level ( $r = -0.26$ ,  $p < 0.01$ ).

**Conclusion:** The circulatory levels of histidine may serve as a useful biomarker for the assessment of disease

activity and guiding treatment in TA patients. However, its use in clinical settings will require future studies on large patient cohorts in a longitudinal manner and procedural optimization as well to improve accuracy.



### Biography:

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### Speaker Publications:

- [1] W.h. Liu, T.c. Liu, M.c. Yin, Beneficial effects of histidine and carnosine on ethanol-induced chronic liver injury, Food and chemical toxicology 46 (2008) 1503-1509.
- [2] A.M. Wade, H.N. Tucker, Antioxidant characteristics of L-histidine, The Journal of Nutritional Biochemistry 9 (1998) 308-315.

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