

# Chemokine Receptors Expression on Peripheral CD4-Lymphocytes in Rheumatoid Arthritis: CD4+CD183+ As A Diagnostics Marker for Disease Activity in Rheumatoid Arthritis

Samuel Asamoah Sakyi<sup>1</sup>, Tonnies Abeku Buckman<sup>1</sup>, Kwame Yeboah-Mensah<sup>1</sup>, Daniel Antwi-Berko<sup>2</sup>, Alfred Effah<sup>1</sup>, Ebenezer Senu<sup>1</sup>, Dzifa Dey<sup>3</sup>, Maxwell Antwi<sup>4</sup>, Joseph Yorke<sup>1</sup>, Andy Boateng<sup>1</sup>, Akwasi Addei<sup>1</sup>, Muniru Tanko<sup>5</sup>, and Richard Boateng<sup>6</sup>

<sup>1</sup>Kwame Nkrumah University of Science and Technology

<sup>2</sup>VU University Medical Centre Amsterdam

<sup>3</sup>Korle Bu Teaching Hospital

<sup>4</sup>Koforidua Technical University

<sup>5</sup>University for Development Studies

<sup>6</sup>Komfo Anokye Teaching Hospital

January 30, 2024

## Abstract

Background: T cell chemokines and its receptors play important roles in the development and progression of rheumatoid arthritis (RA). Their involvement has been reported in inflammatory autoimmune diseases. However, their role in RA in the Ghanaian population has not been explored. We evaluated the intracytoplasmic CD4+ T cell chemokine receptors in rheumatoid arthritis patients in Ghana and determined their relationship with disease activity. Methods. This case control study included 48 newly diagnosed RA patients and 30 apparent healthy controls from the orthopaedic units of Komfo Anokye Teaching Hospital (KATH), Kumasi and Korle-Bu Teaching Hospital (KBTH), Accra, Ghana. A well-structured questionnaire was used to obtain sociodemographic data. Blood samples were also collected and processed for flow cytometric analysis. Statistical analyses were done using SPSS version 26.0 and R programming language. Results: This study found a significant difference in age group ( $p < 0.0001$ ), marital status ( $p = 0.0210$ ), occupation ( $p = 0.0140$ ), educational level ( $p = 0.0210$ ) and religion ( $p = 0.0100$ ) between RA patients and healthy controls. Moreover, haemoglobin level ( $p = 0.0010$ ), waist circumference ( $p < 0.0001$ ) and hip circumference ( $p = 0.0040$ ) were significantly different between RA patients and healthy controls. RA patients had significantly lower levels of CD4+CD183+ compared to the control group ( $p < 0.001$ ), and was positively correlated with DAS score ( $r = 0.0397$ ,  $p = 0.789$ ). In Receiver Operator Characteristics analysis, CD4+CD183+ could significantly detect rheumatoid arthritis with a very high area under the curve ( $AUC = 0.687$ ,  $p = 0.018$ ). At a cut-off of 0.082, CD4+CD183+ was the best chemokine receptor for detecting RA with a sensitivity of 90.0%, specificity of 25.9%, a positive predictive value of 69.2%, and a negative predictive value of 58.3%. Conclusion: CD4+CD183+ could serve as useful diagnostics and disease-monitoring marker for rheumatoid arthritis in the Ghanaian population.

## Hosted file

RA\_Manuscript\_Final.docx available at <https://authorea.com/users/468886/articles/708128-chemokine-receptors-expression-on-peripheral-cd4-lymphocytes-in-rheumatoid-arthritis-cd4-cd183-as-a-diagnostics-marker-for-disease-activity-in-rheumatoid-arthritis>