ABSTRACT

Platelet-leukocyte aggregates (PLAs) are associated with increased thrombosis risk, but it remains unclear how formation of specific PLAs increases the risk of thrombosis. The influence of PLA formation is especially important for cancer patients, since thrombosis accounts for approximately 10% of cancer-associated deaths. Our objective was to characterize and quantify PLAs in whole blood samples from lung cancer patients and healthy volunteers to characterize PLA formation in cancer-associated thrombosis.

Consenting lung cancer patients and healthy volunteers were enrolled. Lung cancer patients had higher percentages of platelet-T cell aggregates (PTCAs) than healthy volunteers among both CD4+ lymphocytes ($p \leq 0.0001$, sensitivity = 76.92%, specificity = 72.55%) and CD8+ T lymphocytes ($p \leq 0.0001$, sensitivity = 75.00%, specificity = 73.08%).

Lung cancer patients with a history of an arterial thrombotic event (ATE) had increased numbers of platelets in CD8+ PTCAs than patients with no history of ATE ($p \leq 0.01$, sensitivity = 63.04%, specificity = 64.44%). Lung cancer patients with a history of venous thromboembolism (VTE) had higher P-selectin expression within CD4+ PTCAs ($p \leq 0.01$, sensitivity = 75%, specificity = 66.67%) and CD8+ PTCAs ($p \leq 0.001$, sensitivity = 66.67%, specificity = 100%) than patients with no history of VTE.

Our findings demonstrate that characterization of PTCAs has clinical utility in differentiating lung cancer patients from healthy volunteers and stratifying lung cancer patients by history of thrombosis. PTCA formation may therefore be an important biomarker for lung cancer and cancer-associated thrombosis.

COLLEGE OF MEDICINE AND LIFE SCIENCES
THE UNIVERSITY OF TOLEDO

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1872

DISSERTATION PRESENTATION
by

Claire Meikle

March 28, 2019

Platelet-Leukocyte Aggregation in Lung Cancer Patients

Ph.D. in Biomedical Sciences

AWARDS

2019—Poster Presentation at Immunology 2019™ Meeting

2018—American Association of Immunologists Careers in Immunology Fellowship

2018—Oral Presentation at Midwest Platelet Conference

2018—The University of Toledo 3MT®, 1st place

2018—Council of Biomedical Graduate Students 2018 Graduate Research Forum, Finalist, Poster Presentation

2017—Council of Biomedical Graduate Students 2017 Graduate Research Forum, Finalist, Oral Presentation, 1st place

2014—University of Toledo College of Medicine MD/PhD Scholarship—Medical Degree

2014—University of Toledo College of Medicine MD/PhD Scholarship—Graduate Degree

PUBLICATIONS

Meikle CK, Kelly CA, Garg P, Wuescher LM, Ali RA, Worth RG. 2017. Cancer and Thrombosis: The Platelet Perspective. *Front Cell Dev Biol* 4:147.

Meikle CK. 2017. Researchers study link between lung cancer, thrombosis, *The Toledo Blade.*

Meikle CK, Meisler AJ, Bird CM, Jeffries JA, Azeem N, Garg P, Crawford EL, Kelly CA, Gao TZ, Wuescher LM, Willey JC, Worth RG. 2019. Platelet-T cell aggregates in lung cancer patients: Implications for thrombosis. *Arterioscler Thromb Vasc Biol* (Under review)

FUTURE PLANS

Claire plans to complete medical school and apply to internal medicine residency programs. She intends to pursue a fellowship and conduct research in the specialty of infectious disease.

PRESENTED ABSTRACTS

Meikle CK, Meisler AJ, Garg P, Kelly CA, Jeffries JA, Gao T, Bird CM, Willey, JC, Worth, RG. 2019 (upcoming). Increased activated platelet binding to T cells in lung cancer patients is correlated with history of thrombosis. Poster presentation at Immunology 2019, San Diego, CA.

Meikle CK, Meisler AJ, Bird CM, Jeffries JA, Azeem N, Garg P, Crawford EL, Kelly CA, Gao T, Wuescher LM, Willy JC, Worth RG. 2018. Increased activated platelet binding to T cells in lung cancer patients is correlated with history of thrombosis. Oral presentation and poster presentation at the Midwest Platelet Conference, Oklahoma City, OK.

Meikle CK, Jeffries JA, Meisler AJ, Wuescher LM, Crawford EL, Willey JC, Worth RG. 2018. Effect of platelet-leukocyte aggregates on platelet and T cell activity in lung cancer patients. Oral presentation at the 2018 Midwest Graduate Research Symposium, Toledo, OH.

Meikle CK, Jeffries JA, Meisler AJ, Wuescher, LM, Crawford, EL, Willey JC, Worth RG. 2018. Effect of platelet-leukocyte aggregates on platelet and T cell activity in lung cancer patients. Poster presentation at the 2018 Graduate Research Forum, Toledo, OH.

Meikle CK, Garg P, Kelly CA, Gao T, Crawford EL, Willey JC, Worth RG. 2017. Platelet hypersensitivity as a potential mechanism of thrombosis in lung cancer. Oral presentation at the 2017 Graduate Research Forum, Toledo, OH.