EJR European Journal of Rheumatology

DOI: 10.5152/eurjrheum.2019.19025

Letter to the Editor

Correlation between senescence-associated secretory phenotypes factors in synovial fluid and serum and structural changes in osteoarthritis

Jose E. Rubio[1], Carla Scanzello[2], David T. Felson[3], Matt B. Au[3], Joyce Goggins[3], Anne Plunkett[3], Devyani Misra[3]

Dear Editor,

Currently, no biomarkers are available for structural changes in osteoarthritis structural disease in osteoarthritis (OA) (1). Increase in the permeability of the synovial/blood barrier in OA enables greater exchange between the synovial cavity and systemic circulation. Thus, it is possible to identify systemic biomarkers relevant to prognosis, diagnosis, or phenotyping that may reflect changes in the synovial cavity. We aimed to correlate the levels of potential biomarkers associated with OA in synovial fluid and serum of patients with knee OA to understand whether local changes in these mediators are reflected systemically. We focused on senescence-associated secretory factors because advanced age is a major risk factor and senescence is implicated in aging and OA. To our knowledge, no previous studies have assessed this correlation. We recruited community-dwelling, ambulatory patients with knee OA from rheumatology clinic at Boston Medical Center, Boston, MA, USA. All participants underwent knee effusion aspiration at least once on a prior visit to exclude inflammatory and crystal arthritis. The knee synovial fluid that was aspirated for usual care during clinic visit and blood were collected contemporaneously and stored at -80°C. The synovial fluid and serum were ana-

Table 1. Correlation between senescence-associated secretory factors in synovial fluid and serum and osteoarthritis.

Analyte	Category	SF pg/mL Median (IQR)	Serum pg/mL Median (IQR)	Rho	p
STRONGLY CORRELATED (Rho≥0.5)					
CXCL13	Chemokine	103.6 (15.2)	92.8 (62.5)	0.7479	0.03
uPAR	Proteinases	2322.5 (1894)	1067.9 (798.7)	0.6474	0.08
MMP12	Proteinases	147.3 (24.9)	159.7 (17.1)	0.6350	0.09
ICAM-1	Adhesion molecule	161834.5 (165368)	157307.5 (230114)	0.6290	0.09
CCL11	Chemokine	177.9 (62.9)	236.3 (44.8)	0.6116	0.11
IL-1b	Interleukin	20.2 (1.04)	24.6 (2.86)	0.5795	0.13
CXCL1	Chemokine	507.6 (199.54)	446.4 (253.49)	0.5671	0.14
IGFBP7	Growth factor	17024.5 (5899)	28820.5 (15871)	0.5609	0.15
PAI-1	Protease inhibitor	14487.0 (5467)	14487.0 (0)	0.5574	0.15
CCL1	Chemokine	8.5 (2.28)	8.7 (1.12)	0.5335	0.17
IGFBP3	Growth factor	263111 (276567)	827635 (773075)	0.5272	0.18
MMIF	Chemokine	11578.5 (4044)	1637.5 (599.00)	0.5113	0.20

IQR: interquartile range; uPAR: urokinase receptor; ICAM: intercellular adhesion mollecule-1; IGFBP: Insulin growth factor binding protein; MMIF: Macrophage migration inhibitory factor; PAI: plasminogen activator inhibitor.

ORCID IDs of the authors:
J.E.R. 0000-0002-8800-8810;
C.S. 0000-0002-9290-188X;
D.T.F. 0000-0002-2668-2447;
M.B.A. 0000-0002-5084-483X;
J.G. 0000-0002-8844-7207;
A.P. 0000-0001-7653-5747;
D.M. 0000-0003-2881-7920.

Cite this article as: Rubio JE, Scanzello C, Felson DT, Au MB, Goggins J, Plunkett A, et al. Correlation between senescence-associated secretory phenotypes factors in synovial fluid and serum and structural changes in osteoarthritis. Eur J Rheumatol 2020; 7(1): 44-5.

[1] Department of Internal Medicine, Metrowest Medical Center, Massachusetts, USA
[2] Division of Rheumatology, University of Pennsylvania, Pennsylvania, USA
[3] Department of Medicine/Section of Rheumatology, Boston University, Massachusetts, USA

Address for Correspondence:
Jose E. Rubio; Department of Internal Medicine, Metrowest Medical Center, Massachusetts, USA

E-mail: jmosquer@bidmc.harvard.edu

Submitted: February 4, 2019
Accepted: April 3, 2019
Available Online Date: August 20, 2019

lyzed by multiplex enzyme-linked immunosorbent assay (ELISA) using a Luminex analyzer for metalloproteinases, growth factors, and related anabolic proteins, cytokines, chemokines, proteases, adhesion molecules, and collagen proteins. Pearson's correlation was used to assess correlations between markers in synovial fluid and serum using SAS 9.3. We included eight participants (mean age, 70.8±15.6 years; 87.5% women; and mean BMI, 34.1±8.9 kg/m2). The results did not reach statistical significance due to small numbers; however, based on the correlation co-efficient, we found some factors that were strongly correlated (Table 1) in synovial fluid and serum. This first exploratory project provides insight into how strongly some systemic markers may be reflective of OA-related processes arising from joint pathology. Further largescale studies are required to validate our findings and examine the association between systemic biomarkers and structural and symptomatic outcomes in OA.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - D.M., C.S., D.F.; Design - J.E.R., D.M., C.S., D.T.F.; Supervision - D.M., C.S., D.T.F.; Resources - D.M., D.T.F.; Materials - D.M., D.T.F.; Data Collection and/or Processing - M.B.A., J.G., A.P., D.M.; Analysis and/or Interpretation - J.E.R., C.S., D.T.F., M.B.A., D.M.; Literature Search - J.E.R., D.M.; Writing Manuscript - J.E.R., D.M.; Critical Review - J.E.R., C.S., D.T.F., M.B.A., J.G., A.P., D.M.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Reference

1. Hunter DJ, Nevitt M, Losina E, Kraus V. Biomarkers for osteoarthritis: Current position and steps towards further validation. Best Pract Res Clin Rheumatol 2014; 28: 61-71. **[CrossRef]**