TITLE: NLRP3 inflammasome enhances neutrophil extracellular traps in women with stage III/IV endometriosis: an interpretation between genetics and lesion type

Name: Dr. Pratip Chakraborty
Affiliation: Senior Scientist at Institute of Reproductive Medicine, Kolkata, India
Country: India
Email ID: pratip_2011@yahoo.com

ABSTRACT (upto 300 words)

Endometriosis is characterized by number of processes like vascularization, hypernociception, and fibrosis, cardinal cause being inflammation. A novel extracellular killing mechanism, NET, is documented to reflect an inflammatory status in deep infiltrating endometriosis. Since, endometriosis demonstrates similarities with chronic inflammatory and autoimmune disorders; we postulated inflammatory responses in endometriosis may become modulated through a feed-forward loop of NET-induced specific cytokine production thus providing insights against potentiality of endometriotic cells to limit progression of the disease.

Twenty-two consented women (24-39 years) with endometriosis (Group A) (Stages III–IV) and age-matched counterpart/s of male sub-fertility (Group B; control), n=18) were recruited between January to December 2022 from Institute of Reproductive Medicine, Kolkata. Eutopic endometrium, were collected from women undergoing diagnostic laparoscopy (Group A) or by curettage from women undergoing endometrial ablation (Group B).

The mean (±SD) age of the study population was 31.6±5.2 years. Hyperestrogenic milieu possibly stimulated ($p<0.001$) pro-inflammatory molecules (IFN-γ, TNF-α, IL-6, TGF-β) in endometriosis as observed by western-blot and qRT-PCR. A significant up-regulation ($p<0.001$) was observed in relative mRNA expression of NLRP3 and PYCARD gene in Group A. However, caspase 1 expression documented non-significant variation in biopsies from endometriosis patients. Western blot corroborated the finding/s. The outcome of NLRP3 activation was supported by increased ($p<0.002$) mRNA expression of IL-1β. NETs were detected significantly higher ($p<0.01$) in 54.54% (12/22) patients in group A compared to control (16.66%; (3/18)). Moreover, quantification of NETs showed a significantly higher amount in endometriosis compared to group B (0.097 vs. 0.02, $p< 0.03$). Spermann-rank correlation revealed a positive correlation between IL-1β with NLRP3 ($p< 0.001$), and PYCARD ($p< 0.01$) and caspase1 ($p< 0.01$) and IL-1β ($p< 0.01$) with NET-positive cell/s in endometriosis.

The proposed study aims to understand potential role of NLRP3 inflammasome complex as a "double-edged sword" in the development and pathophysiology of endometriosis.

BIOGRAPHY (upto 200 words)

Dr. Pratip Chakraborty is currently leading the Basic Science Unit of Assisted Reproduction Division in Institute of Reproductive Medicine, Kolkata. The overall theme of my lab is to understand the molecular basis for the pathogenic mechanism/s underlying complex female reproductive disease/s including polycystic ovary syndrome, adenomyosis, endometriosis and unexplained spontaneous miscarriage. We broadly concentrate on role of metabolic disturbances in the crossroads of pro- and anti-inflammatory context/s in physiology of pregnancy. To this end we work with genes, proteins, cells, mice and human patients.
Dr. Chakraborty is the only Indian International Reviewer for formulation of guidelines of Recurrent Pregnancy loss and Controlled Ovarian Stimulation for IVF/ICSI by Early Pregnancy Guideline Development Group and Reproductive Endocrinology and Ovarian Stimulation Group of European Society of Human Reproduction and Embryology (ESHRE) in 2017 and 2019.
His publications in various peer-reviewed journal/s comprise every basic techniques of reproduction. He has over 50 publications that have been cited over 400 times, and his publication h-index is 10. He has been serving as an editorial board member of several reputed journals including Reproductive Sciences, Reproduction, Scientific Repots to name a few.

Presenter Name: Pratip Chakraborty
Mode of Presentation: Oral/~~Poster.~~
Contact number: + 91-9830792287