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Redefining eosinophil crystalloid granules as a potential new functional unit in extracellular inflammatory Events

Salahaddin Mahmudi-Azer[1*], Peter F Weller[2], Ann M Dvorak[2], Redwan Moqbel[3], Peter D Paré[4]

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Eosinophils are major effector cells in allergic inflammatory response. They are known to synthesize, store, and release a wide range of pro-inflammatory mediators. Eosinophils contain different populations of mediator-storage organelles, including small secretory vesicles as well as crystalloid granules. In cytolysis, eosinophil cell membrane loses its integrity and crystalloid granules are released to extracellular space. Potential function of crystalloid granules in extracellular space as it relates to inflammatory events remains widely unknown. We hypothesized that eosinophil crystalloid granules are equipped to function independently in extracellular space. Our findings indicate that both DNA and RNA localize to human and rabbit eosinophil crystalloid granules and that RNA seems to be synthesized in intra-granular space further suggesting the presence of functional transcription machinery inside the granules. Furthermore, we show here that crystalloid granules express functional membrane receptors for a cytokine, IFN-gamma, as well as G protein-coupled membrane receptors for a chemokine, eotaxin. Our findings indicate that these receptors function by activating signal-transducing pathways within granules leading to mediator release from granules to extra-granular space in a cell free environment. Taken together our findings define a new potential role for eosinophil crystalloid granules as independent extracellular functional units in inflammatory events and may reveal a novel target in modulating the inflammatory events.

Author details
[1]From Department of Medicine, University of Calgary, Alberta, Canada. [2]Harvard Thorndike Laboratory and Charles A. Dana Research Institute, Departments of Medicine and Pathology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215, USA. [3]Department of Immunology, University of Manitoba, Faculty of Medicine, Winnipeg, Manitoba, Canada. [4]The James Hogg iCAPTURE Centre, St. Paul's Hospital, Dept. of Medicine, University of British Columbia, Canada.

* Correspondence: sazer@shaw.ca
[1]From Department of Medicine, University of Calgary, Alberta, Canada
Full list of author information is available at the end of the article

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