



Detection and evaluation of diseases associated with NETosis in Human Plasma using Nu.Q® NETs ChemiLuminescence Immunofluorescent Assay.

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Background

NETosis is a regulated cell death mechanism leading to the formation of neutrophil extracellular traps (NETs) and is a rapid and effective immunological response to infection. However, excessive production of NETs can lead to host tissue damage and, in severe cases, to sepsis and death. It is now well established that inappropriate NETs production may be associated with an uncontrolled inflammatory response and resulting pathologies.

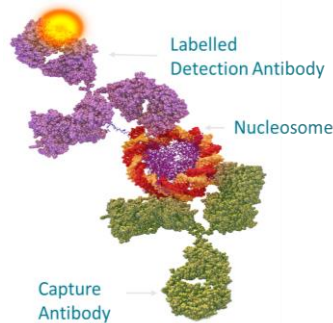
The aim of this study was to evaluate circulating nucleosome levels as a biomarker of NETosis in patient populations with different NET-related pathologies including sepsis and COVID-19 infection using a rapid nucleosome test CE marked for the clinical measurement of NETs in plasma.



Immuno-fluorescence on NETs produced in vitro. H3.1 nucleosomes are part of NETs.

Materials and Methods

Study population : Frozen EDTA plasma samples from 269 controls and 275 patients with diseases associated with NETosis such as COVID-19 (n=80), Sepsis suspicion (n=81), Cirrhosis or NASH (n=10), Cytomegalovirus Infection (n=23), Gonorrhoea Infection (n=10), Myocardial Infarction (n=40), Alzheimer's disease (n=12), HAV Infection, (n=6), Lyme Infection (n=6), Traumatic Brain Injury (n=6), heart failure (n=1) were included. Controls were self-certified as healthy donors from EFS (Etablissement Français du Sang).



Nu.Q® NETs sandwich ImmunoAssay

Nu.Q® NETs Assay (Belgian Volition SRL)

- Quantitative ImmunoAssay CE marked



Partners



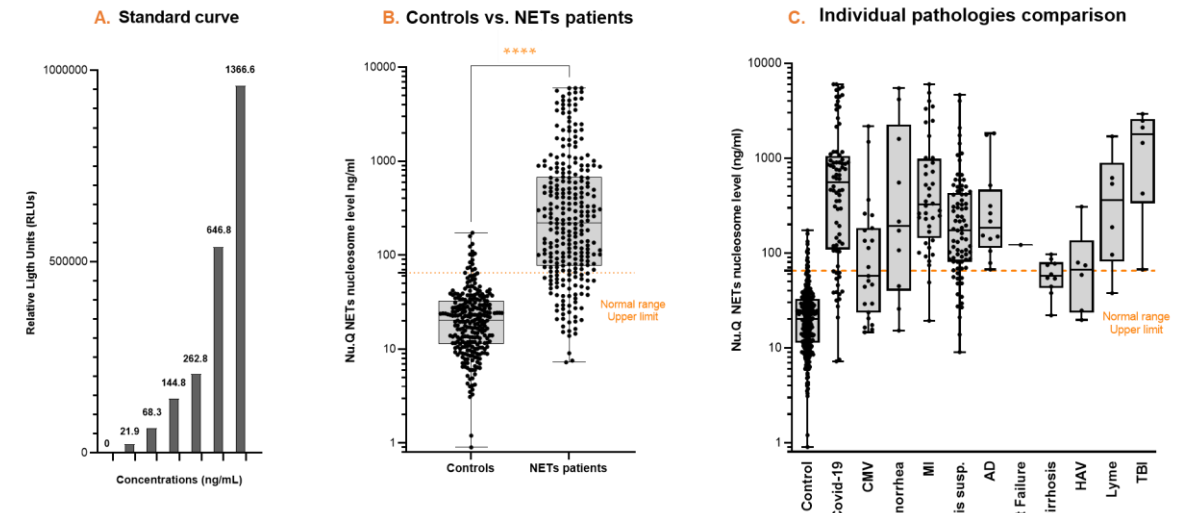
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Results

Assessment of circulating nucleosome levels in the control population, compared to the population of patients with NET-related pathologies. **A.** Standard curve of the Nu.Q® NETs kit. **B.** Significantly elevated levels of circulating nucleosomes were found in patients with NETs related diseases compared to control population (mean 732,2 ng/mL vs 26,1 ng/mL, p < 0.0001). **C.** All pathologies were individually compared to controls.



B-C. On this clinical cohort, based on a normal range up to 65 ng/mL, the clinical performances are about 79,3% sensitivity at a specificity of 94,1 %. Boxes represent 25th-75th percentile with median. Whiskers represent min to max variation. *, **, **** and ***** represent p-value < 0.05, < 0.005, < 0.0005 and < 0.0001, respectively.

Conclusions and perspectives

- The Nu.Q® NETs assay targets nucleosome-containing NETs and nucleosome metabolites of NETs and may be used as a biomarker for sepsis, COVID-19, organ injury, inflammatory disorders and other diseases associated with NETs.
- The assay is also validated on fresh EDTA plasma independent cohort (Normal range ≤ 24 ng/mL, sensitivity of 79,4 % at 93,8 % specificity).

For more information, please refer to the Nu.Q® NETs product IFU (Volition exhibition stand).