# Measurement of CXCL10 in the Management of COVID-19

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## Introduction

- **CXCL10** is a pro-inflammatory chemokine
  - Secreted in response to IFN-γ by a variety of cells
  - Binds to CXCR3
  - Promotes migration of T cells & monocytes
  - Regulates immune response

- **CXCL10** raised in many inflammatory diseases due to immune system dysfunction
  - Type 1 diabetes
  - Rheumatoid arthritis
  - Cryoglobulinaemia
  - Sjögren’s syndrome
  - Behçet’s Disease
  - COVID-19

- **SARS-CoV-2** enters pulmonary and neuronal cells via upper respiratory tract, triggering
  - CXCL10 production
  - Recruitment of CXCR3-expressing cells
  - Demyelination in CNS
  - Cytokine storm & Acute Respiratory Distress Syndrome (ARDS)

- Raised CXCL10 levels in Floor Bessemer Wing, 18.45%

- LOD=0.087pg/ml

- Validation of kit performance against set criteria (table 1)

- **CXCL10** in diagnostic laboratory

- Linearity >90%

- Stability:
  - Control aliquots stable up to 4 hours after centrifugation

## Results

- **Validation of kit performance against set criteria (table 1)**
  - Acceptable performance

<table>
<thead>
<tr>
<th>Evaluation Criteria As listed in Validation Plan</th>
<th>Acceptance Criteria As listed in Validation Plan</th>
<th>Acceptable / Not Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assay performance compared to manufacturer’s claims</td>
<td>• Intra-assay precision &lt;5%</td>
<td>• 3.52%: Acceptable</td>
</tr>
<tr>
<td></td>
<td>• Inter-assay precision &lt;10%</td>
<td>• 18.45%</td>
</tr>
<tr>
<td></td>
<td>• Recovery &gt;88%</td>
<td>• 64.9%. Measured CXCL10 higher than expected. Assay intended to detect raised CXCL10, not deficiency: Acceptable</td>
</tr>
<tr>
<td></td>
<td>• Linearity &gt;90%</td>
<td>• 311%, r² 0.99 Measured CXCL10 higher than expected. Assay intended to detect raised CXCL10, not deficiency: Acceptable</td>
</tr>
<tr>
<td></td>
<td>• Sensitivity &gt;80%</td>
<td>• 100%: Acceptable</td>
</tr>
</tbody>
</table>

- **Specificity:** healthy controls within reference range

- **Linewarity:**
  - Control aliquots stable at -20°C
  - Comparable results for samples stored at -20°C and 4°C

- **RnD QC’s**
  - Within expected ranges
  - Plotted on Levey-Jennings chart

- **In-house IQC created**
  - Plotted on Levey-Jennings chart

- **To prepare in-house IQC**
  - Healthy control
  - Inflammatory disease

- **CV of calibrator, controls and samples <10%**

- **Raised CXCL10 levels in predicted patient groups**
  - Type 1 DM, RA, SLE, SS, Behçet’s

- **Acceptable duplicate CVs**

- **Raised in:**
  - RA, SLE, COVID-19

## Objective

- Verify suitability of commercially available ELISA kit for CXCL10 in diagnostic laboratory

## Method

- Serum CXCL10 measured using R&D CXCL10 (IP-10) ELISA kit & Dynex DS2 automated ELISA processor

- Evaluation included precision testing, stability, linearity, recovery, interference, sensitivity, and limit of detection

- 32 samples from 26 patients with COVID-19

## Keywords

Chemokine, CXCL10, COVID-19, ARDS

## Discussion

- Results confirm **CXCL10** is raised in COVID-19

- Provides information on disease severity, informing patient treatment

- Validation data demonstrated that CXCL10 also raised in RA and SLE patients

- Measurement may be relevant to patient management

- Have not yet determined if CXCL10 is raised in other viral illnesses

## Conclusion

- Serum CXCL10 can be accurately and reliably measured in a diagnostic laboratory under real-life conditions

## References


![](Figure 1: Raised CXCL10 compared to reference range (38-361 pg/ml) in 29/32 samples)

## Table 1: Summary of validation data

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</thead>
<tbody>
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<td>QC performance</td>
<td>• RnD QC’s</td>
<td>• Acceptable when freshly reconstituted</td>
</tr>
<tr>
<td></td>
<td>• Within expected ranges</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Plotted on Levey-Jennings chart</td>
<td></td>
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<td>• Healthy control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inflammatory disease</td>
</tr>
<tr>
<td>Technical validation of assay performance</td>
<td>• CV of calibrator, controls and samples &lt;10%</td>
<td>• Acceptable duplicate CVs</td>
</tr>
<tr>
<td></td>
<td>• Raised CXCL10 levels in predicted patient groups</td>
<td>• Acceptable</td>
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- Raised serum CXCL10 in COVID-19 suggests T cell activation
- CXCL10 has been suggested as a biomarker of COVID-19 severity and outcome

**Figure 1:** Raised CXCL10 compared to reference range (38-361 pg/ml) in 29/32 samples