Detection of calprotectin in clinical fecal samples: A COMPARATIVE STUDY OF ACTIM® CALPROTECTIN RAPID TEST AND BÜHLMANN FCAL ELISA

Kanto Laura¹, Reinman Mirka¹, Korvuo Armi¹, Juhila Juuso¹.
¹Medix Biochemica, Klovinpellontie 3, FI-02180 Espoo, Finland

Calprotectin (Figure 1) is a pro-inflammatory, calcium-binding protein complex primarily secreted by neutrophils at the site of inflammation.⁵–⁷ Calprotectin is released and easily detected in the mucosa, where neutrophils accumulate. Analysis of fecal calprotectin is commonly used in clinical diagnostics and follow-up of inflammatory bowel diseases (IBD) – Crohn’s disease and ulcerative colitis – that are characterized by pathological inflammation of the bowel.⁴

Fecal calprotectin is a non-invasive, stable and sensitive biomarker of IBD. While several assays for the detection of fecal calprotectin have been developed, both quantitative differences and low intra-assay agreement have been observed between different commercial calprotectin assays.⁵⁶ These differences may be caused by variable extraction devices and assay procedures.

In this study the performance of the semi-quantitative Actim® Calprotectin rapid test was compared with a quantitative Bühlmann fCAL ELISA reference test. Actim Calprotectin is a rapid, one-step dipstick test that reports fecal calprotectin concentration at three clinically relevant cut-offs (Table 1). Actim Calprotectin distinguishes patients with healthy mucosa or irritable bowel syndrome (IBS), from those with pathologic inflammation of the bowel.

**TABLE 1. The clinical significance of fecal calprotectin concentration ranges.**

<table>
<thead>
<tr>
<th>Calprotectin concentration range</th>
<th>Clinical implication</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50 μg/g</td>
<td>No inflammation; possible IBS</td>
</tr>
<tr>
<td>50–200 μg/g</td>
<td>Mild inflammation</td>
</tr>
<tr>
<td>&gt;200 μg/g</td>
<td>IBD</td>
</tr>
</tbody>
</table>

**FIGURE 1.** The complex of calprotectin heterodimers. Calprotectin subunits S100A8 (grey) and S100A9 (violet) each bind two calcium ions (blue). The model was generated from a publicly available calprotectin crystal structure (PDB ID: 1XK4) using PyMOL software.
Acknowledgements
We wish to thank our Laboratory Technicians Kirsti Pokka and Ulla Tienhaara for their excellent technical assistance in this study.

References