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Rapid detection of fecal occult blood: A COMPARISON BETWEEN ACTIM COMBI® HEMOGLOBIN TRANSFERRIN AND CERTEST FOB-TRANSFERRIN

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HEMOGLOBIN & TRANSFERRIN IN GASTROINTESTINAL BLEEDING

The presence of hemoglobin and transferrin in feces indicates gastrointestinal bleeding, and is associated with several pathologies, including colorectal cancer. Immunological determination of fecal hemoglobin and transferrin allows sensitive detection of fecal occult blood (FOB).[1–4] Rapid tests are useful tools in colorectal cancer screening, as they can detect FOB early in the course of the disease – even prior to the onset of symptoms.

Hemoglobin is an oxygen-carrying metalloprotein that constitutes 97% of the dry weight of red blood cells,[5] while transferrin glycoprotein controls the level of free iron in biological fluids6. Hemoglobin is an unstable analyte and dissociates in the upper gastrointestinal (GI) tract, while transferrin is more stable and capable of remaining intact through the GI tract (Figure 1). The bianalyte approach utilized in these dual hemoglobin-transferrin tests thus allows for the detection of bleeding originating from different parts of the GI tract.

Actim Combi® Hemoglobin Transferrin is a qualitative lateral flow dipstick test for the rapid detection of FOB. It is a hygienic and user-friendly test that reports visually interpretable results in just 10 minutes. This study assessed the agreement between Actim Combi Hemoglobin Transferrin and another commercial rapid test CerTest Biotec FOB-Transferrin in the detection of hemoglobin and transferrin in clinical fecal samples.

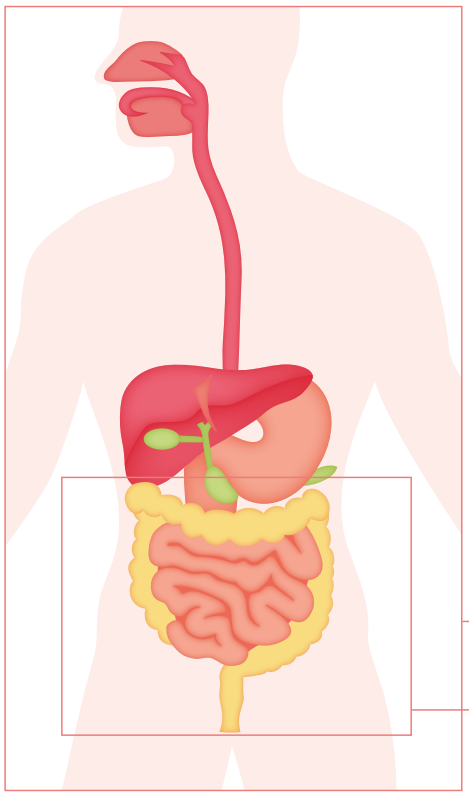

Figure 1. Actim Combi Hemoglobin Transferrin detects both transferrin originating from the upper or lower part and hemoglobin originating from the lower part of the gastrointestinal tract.

DETECTION OF FECAL OCCULT BLOOD (FOB)

In the present study, 105 frozen clinical fecal samples were assessed for the presence of hemoglobin and transferrin. Fecal suspensions were prepared in sample buffer at the same time for both tests. The assays were performed in parallel by Actim Combi Hemoglobin Transferrin dipstick test (30322ETAC, Medix Biochemica) and CerTest Biotec FOB-Transferrin lateral flow card test (FT820001FC, CerTest Biotec) according to manufacturers' instructions. Hemoglobin and transferrin concentrations were also measured by quantitative IEMA (Medix Biochemica).

Actim Combi Hemoglobin Transferrin and CerTest FOB-Transferrin are qualitative chromatographic immunoassays that report the presence of hemoglobin and transferrin as colored lines (Figure 2). The Actim Combi Hemoglobin Transferrin test procedure is completed in a single sealed test tube that remains closed throughout the procedure, while in CerTest FOB-Transferrin test the fecal suspension is first prepared in a stool collection tube and then pipetted into two separate sample windows on the test strip. In addition, the optimized sampling device and one-tube approach of Actim Combi Hemoglobin Transferrin provide excellent intra-assay reliability.

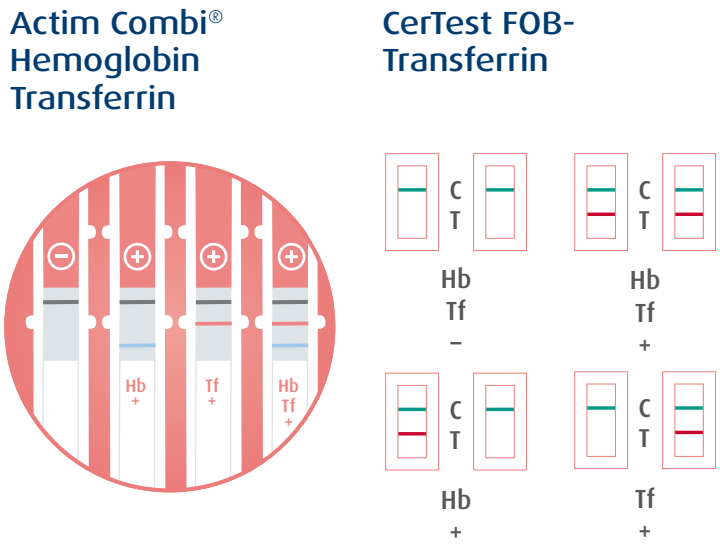

Figure 2. A schematic comparison of the test result interpretation for Actim Combi Hemoglobin Transferrin and CerTest FOB-Transferrin. Actim Combi Hemoglobin Transferrin test result is read from a single result area on the dipstick, while CerTest FOB-Transferrin has two separate results areas.

EXCELLENT AGREEMENT BETWEEN THE TWO METHODS

In the present study, Actim Combi Hemoglobin Transferrin rapid test was shown to perform in an excellent agreement with CerTest FOB-Transferrin in the detection of hemoglobin and transferrin at all concentration ranges (Table 1). The overall inter-assay agreement was 97.1% for the detection of fecal hemoglobin, and 93.3% for the detection of fecal transferrin (Figure 3).

Actim Combi Hemoglobin Transferrin provides a hygienic, reliable and easy-to- use alternative for the detection of FOB in clinical fecal samples, and aids in the early screening of colorectal cancer.

TABLE 1. The number of samples with different concentrations of hemoglobin and transferrin as measured by quantitative IEMA.

HEMOGLOBIN		TRANSFERRIN	
Concentration range (µg/L)	Number of samples	Concentration range (µg/L)	Number of samples
0–<50	81	0–<6.5	77
≥50	24	≥6.5	28

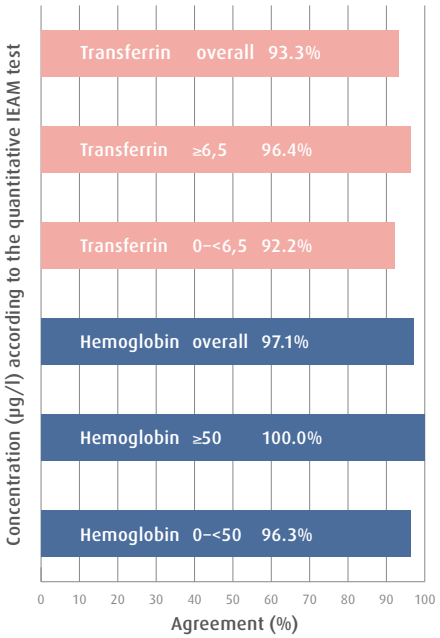

Figure 3. Agreement between Actim Combi Hemoglobin Transferrin and CerTest FOB-Transferrin in the detection of fecal occult blood (FOB) from clinical patient samples.

Acknowledgements

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