TUMOR M2-PK IN STOOL: A SCREENING TOOL FOR COLORECTAL CANCER

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Introduction: Proliferating cells, especially tumor cells, express a special isoenzyme of pyruvate kinase, termed M2-PK which can occur in a tetrameric form with a high affinity to its substrate phosphoenolpyruvate (PEP) and in a dimeric form with a low PEP affinity (http://www.metabolic-database.com). In tumor cells the dimeric form is usually predominant and is therefore termed Tumor M2-PK. An ELISA with monoclonal antibodies against Tumor M2-PK in stool has been developed. Until now only non-specific screening tests for blood in the stool could give a hint of events related to colorectal cancer in about 30% of cases. The present study includes 331 patients that underwent complete colonoscopy after the determination of Tumor M2-PK in stool.

Materials and Methods: Stool samples of patients with colorectal cancer and patients without pathological findings were tested. Tumor M2-PK in stool extracts was determined immunologically with a new quantitative sandwich-type enzyme immunoassay (ScheBo® • Tumor M2-PK™) which is based on two monoclonal antibodies (ScheBo® • Biotech AG, Germany).

Results:

Groups	n	Mean [U/ml]	Median [U/ml]	Range [U/ml]	P vs. controls
Colorectal Cancer	100	57.7 ± 11.4	16.4	0.7 – 800.0	$p < 0.001$
Adenoma	107	4.9 ± 0.8	2.1	0.1 – 51.3	$p \geq 0.05$
Controls	124	3.4 ± 0.5	1.6	0.1 – 30.6	

Conclusion: The fecal levels of Tumor M2-PK are significantly higher in patients with colorectal cancer than in samples of patients with adenoma or healthy controls ($p<0.001$). A reference concentration of >4 U/ml corresponds to a sensitivity of 76% for colorectal cancer. Specificity was 78% for the control group. In comparison to a variety of indirect tests that detect blood in stool with a sensitivity less than 30% Tumor M2-PK has a much higher sensitivity. The test directly detects a tumor-specific enzyme that is released by the tumor itself. Tumor M2-PK has the potential as a screening tool for the early detection of colorectal cancer.

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