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## P-31 MR Spectroscopic Analysis of Human Colon Cancer

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# P-31 MR SPECTROSCOPIC ANALYSIS OF HUMAN COLON CANCER

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Phosphatic metabolic profiles of nineteen malignant and normal human colon specimens were analyzed by techniques of perchloric acid extraction and <sup>31</sup>P MR spectroscopy at 202.4 MHz. Thirty-one individual phosphorus-containing intermediaries of metabolism were identified and their relative concentrations in mole-percentages of phosphorus were computed. Metabolic indices representing ratios and sums of individual or grouped metabolites were concurrently computed. The individual metabolite concentrations and metabolic indices were statistically compared revealing significant differences between malignant and normal tissues (see table). Malignant tissues demonstrate significant increases in the phosphomonoesters and diesters along with corresponding decreases in the high-energy phosphate compounds. While these changes may be relative, the increases in the PME and PDE bands most likely represent an increase in cell

Significant P-Metabolites and Indices		
	Malignant	Noninvolved
PE	7.99 ± 0.43	6.05 ± 0.51 **
IMP	5.00 ± 0.61	3.79 ± 0.67 *
U-3.72δ	2.45 ± 0.34	1.02 ± 0.20 **
U-3.63δ	2.87 ± 0.60	1.18 ± 0.24 *
PC	1.83 ± 0.26	2.72 ± 0.31 *
GPE	1.34 ± 0.11	0.86 ± 0.15 *
PG	17.85 ± 2.96	5.53 ± 1.29 **
PCr	0.60 ± 0.16	3.64 ± 0.64 **
ATP	14.85 ± 2.80	29.90 ± 3.17 **
NS	5.74 ± 0.92	3.11 ± 0.52 *
INDICES		
PME	30.38 ± 1.67	23.01 ± 1.76 **
PDE	21.67 ± 2.74	7.90 ± 1.13 **
PME/Pi	1.71 ± 0.24	1.05 ± 0.11 *
PCr/Pi	0.03 ± 0.01	0.17 ± 0.04 **
PCr/ATP	0.11 ± 0.01	0.36 ± 0.05 **
PE/PC	5.67 ± 1.22	2.36 ± 0.27 **
Modulus	0.48 ± 0.10	0.87 ± 0.12 *
* P < 0.05 ** P < 0.01		

membrane activity and P-lipid metabolism. P-31 MR is effective in differentiating malignant from normal tissues.