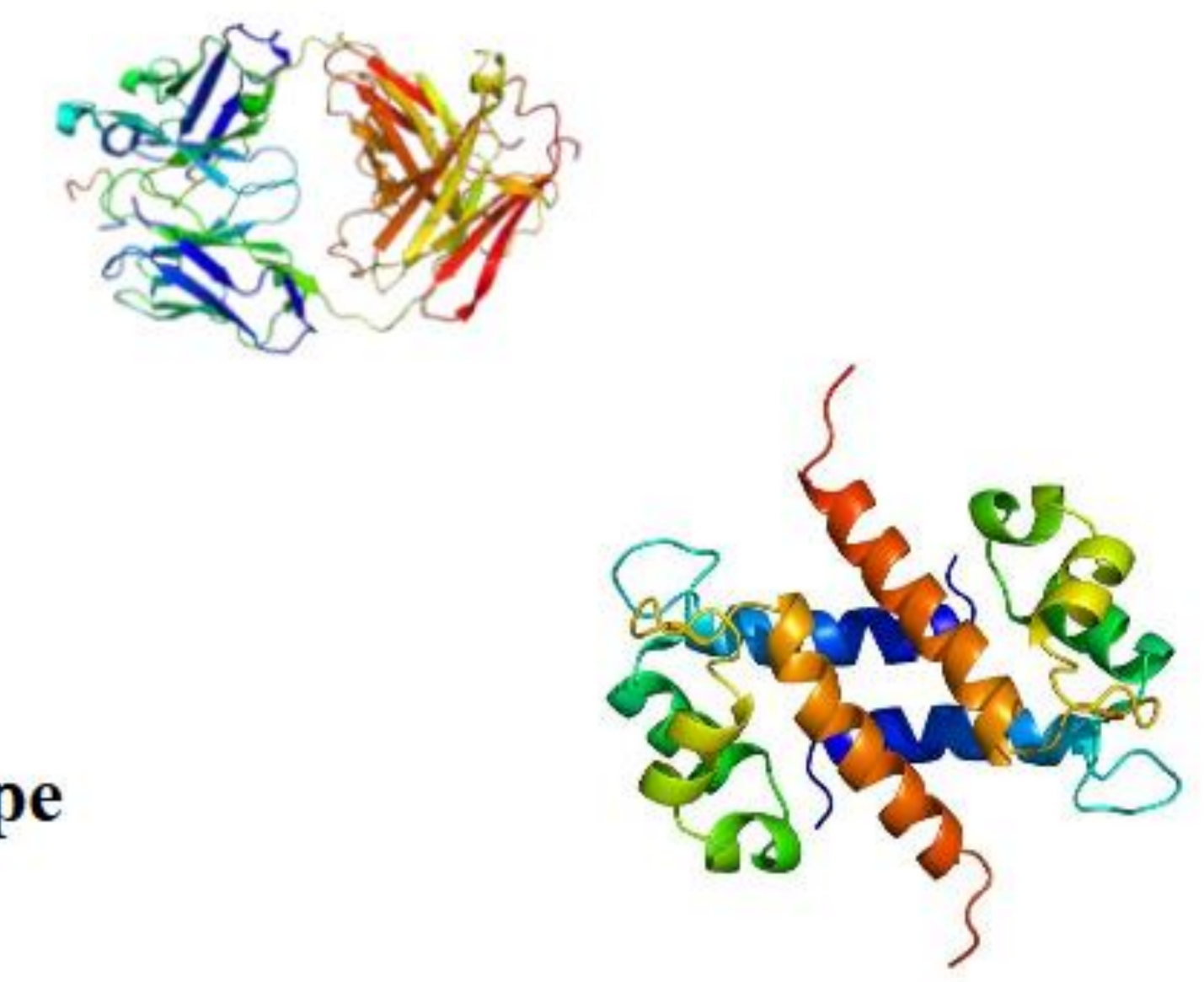


RELATIONSHIP BETWEEN CALCIUM EXCRETION AND SELECTED MACROMOLECULES IN URINE OF CHILDREN WITH UROLITHIASIS

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INTRODUCTION

There is an increasing number of urolithiasis cases in children, especially in youngest patients, even infants. In Europe disease concerns about 2% of population. The most frequent basis of urine stone formation is idiopathic hypercalciuria. The level of calciuria do not explain activity of the disease.

Stones present in urinary tract are biominerals. It is known that to form a stone, imbalance between crystallization promoters and inhibitors is necessary. Some urine macromolecules have impact on stones formation- they could be promoters and inhibitors of crystallization depending on circumstances. Proper structure and level of macromolecules can be a defense against stones formation.

THE AIM

The aim of the study was estimation of potential relationship between calcium, magnesium and phosphorus excretion and the level of four urinary proteins- osteopontin, uromodulin, bikunin and calgranulin.

METHODS:

- we examined 57 children (27 girls, 30 boys) with urolithiasis and idiopathic hypercalciuria, aged 2-18 years
- 24h urine calcium excretion (expressed per kg of body weight) and levels of calcium, magnesium, phosphorus and creatinine in fresh morning urine examinations were performed
- osteopontin, bikunin, uromodulin and calgranulin levels in fresh morning urine sample were examined with ELISA method (osteopontin-Quantikine Human Osteopontin Immunoassay DOST00 R&D Systems®, bikunin- Human Protein AMBP ELISA Kit nr E0965h EIAab®, uromodulin- Human Uromodulin ELISA Kit nr E2280h EIAab®, calgranulin- Human Protein S100-A9 ELISA Kit nr E1793h EIAab®)

	Mean	Median	Min	Max	std. dev.
Urine -Ca mg/kg/d	4,461	4,190	1,3700	7,780	1,699
Urine -Creatinine mg/kg/d	18,728	18,445	9,5300	28,700	3,975
Urine: Ca/creatinine	0,229	0,192	0,0490	0,552	0,112
Urine: Mg/creatinine	0,112	0,110	0,0400	0,250	0,045
Urine: Mg/Ca	0,588	0,500	0,2000	2,070	0,319
Urine: P/creatinine	0,594	0,510	0,2100	1,700	0,348
Urine: uric acid	0,241	0,240	0,1200	0,390	0,062
Osteopontin ng/ml	2058,7	1502,3	8,6000	7028,100	1690,5
Calgranulin pg/ml	268,802	147,490	39,0000	2500,000	451,709
Uromodulin ng/ml	13,516	11,720	3,6900	30,000	7,736
Bikunin ng/ml	23,106	18,370	6,3900	75,710	14,787
Age at the beginning of disease (years)	8,351	9,000	0,5000	16,000	4,404
Age (years)	11,053	11,000	1,0000	18,000	4,993

RESULTS

- There was no statistically significant correlation between studied proteins excretion and calciuria level
- Patients with calcium excretion above 4 mg/kg/24h and patients with normocalciuria in time of examination were similar in terms of excreted proteins

	p	Normocalciuria Patients number	Hypercalciuria Patients number
Osteopontin	0,318408	25	32
Calgranulin	0,844753	25	32
Uromodulin	0,375704	25	32
Bikunin	0,214911	25	32

U Mann-Whitney test: calcium excretion and examined proteins in subgroup with normo- and hypercalciuria in time of examination. (stat. sign. p≤0,05)

- However there was statistically significant negative correlation between Ca/cr ratio and osteopontin and between Mg/cr ratio and osteopontin
- There were no statistically significant correlations between the rest of studied proteins and the rest of ratios (Ca/cr, Mg/Ca, P/cr).

	Patients number	R - Spearman	P (stat.sign.≤0,05)
Ca & Osteopontin	57	-0,215849	0,124330
Ca & Calgranulin	57	-0,114305	0,419736
Ca & Uromodulin	57	0,074677	0,598787
Ca & Bikunin	57	0,241210	0,084953

	Patients number	R - Spearman	T (N-2)	p
Ca/Creatinine & Osteopontin	57	-0,329691	-2,49390	0,015918
Ca/Creatinine & Calgranulin	57	-0,153720	-1,11099	0,271784
Ca/Creatinine & Uromodulin	57	0,151904	1,09755	0,277556
Ca/Creatinine & Bikunin	57	0,110105	0,79112	0,432539
Mg/Creatinine & Osteopontin	57	-0,290766	-2,17025	0,034669
Mg/Creatinine & Calgranulin	57	-0,041394	-0,29586	0,768537
Mg/Creatinine & Uromodulin	57	0,044921	0,32112	0,749428
Mg/Creatinine & Bikunin	57	0,155236	1,12221	0,267029
Mg/Ca & Osteopontin	57	0,242317	1,78365	0,080431
Mg/Ca & Calgranulin	57	0,080511	0,57683	0,566389
Mg/Ca & Uromodulin	57	0,034865	0,24914	0,804254
Mg/Ca & Bikunin	57	0,015648	0,11176	0,911452
P/Creatinine & Osteopontin	57	0,005566	0,03975	0,968447
P/Creatinine & Calgranulin	57	-0,054877	-0,39249	0,696328
P/Creatinine & Uromodulin	57	0,006736	0,04811	0,961820
P/Creatinine & Bikunin	57	0,005748	0,04105	0,967419

Spearman correlation: p ≤ 0,05

CONCLUSION:

it is possible that there is a relations between low osteopontin level and high Ca/cr and Mg/cr ratios in patients with idiopathic hypercalciuria and that this phenomenon has impact on disease activity

