

### 3. Title: Study of the Organic Matrix of Stone.

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#### Objectives

To study the amino acid and carbohydrate spectrum of stone matrix obtained from patients of different age groups.

#### Description

Fifty—seven bladder stones obtained from patients, age ranged from 1 to 50 years, were studied. Isolation of the matrix components, demineralization and fractionation were accomplished by the method described by Keutel (1). The stones were powdered and demineralized with 5% EDTA solution for 3 days, than with 0.1 M Veronal (pH 8.6) for 24 hours and with weak basic solution (pH 11.4) for 2 hours under continuous stirring. After demineralization, they were dialyzed against alkaline solutions and demineralized water. Ten percent of the solutions was lyophilized and determined for the total organic matrix. The rest was analyzed for the subfractions of the matrix, using the method described by Keutel.

Identification of the Amino Acids and Carbohydrate Component was also performed by chromatographic technic as described by King and Boyce (2).

#### Progress

Table I shows that organic matrix comprised from 1.86 to 3.73 percent of the total weight of stones. Ammonium urate and calcium oxalate were the main chemical compositions of stones. The organic matrix contents did not seem to correlate with either the age of patients or the mineral compositions. None of our stones were free the organic matrix.

The percentage of matrix by weight was reported by Gasser et al (3) as 3 to 5%, by Philipsborn (4) as 2 to 3.5%, by Boyce and Garvey (5) as averaging 2.87%, and by Keutel (1) as averaging 2.75% for the inorganic crystalline stones and 1.06% for the organic crystalline stones. The present results are comparable to those of renal stone reported previously.

The amino acids spectrum determined by chromatography in stone, is shown in Table II. Five carbohydrates, including galactose, glucose, mannose, rhamnose and one unidentified spot, were identified by chromatographic method. These results are similar to the composition of calculi reported by King and Boyce (2). Further study is required before any conclusion can be drawn.

Table III demonstrates percentage of subfractionation of organic matrix of stones from patients admitted to the Ubol Hospital.

#### REFERENCES

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Table Average Percentage of Organic Matrix of Stones in Different Age Groups, Ubol Hospital

No. of Stone	Age Groups (years)	Average Percentage of Matrix
3	1 yr	3.31
7	1+—2	1.86
10	2+—3	2.72
9	3+—4	2.58
3	8+—12	2.60
3	40—50	3.73
3	Unknown	2.62
3*	4—8	2.43

\* Obtained from Chiangmai Hospital

Table 2. Amino Acids Identified Chromatographically

Alanine	Glycine
Glutamic acid	Threonine
Aspartic acid	Lysine
Serine	Proline
Leucine	Tryptophane
Isoleucine	Tyrosine
Valine	Methionine
Phenylalanine	Arginine

Table 3. Percentage of Subfractionation Fractions of Organic Matrix of Stone

Age Group (year)	No. of Stones	U.F.	RS <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub> —sed
	2	30.8±13.9	21.1±4.2	34.2±3.8	13.9±4.2
1+—2	6	30.9±8.4	22.2±5.4	16.1±2.9	30.8±6.2
2+—3	9	39.6±8.6	27.1±5.3	12.2±3.1	19.9±4.4
3+—5	6	23.3±5.4	27.4±2.3	15.1±2.2	34.2±4.5
8—12	3	4.9±0.8	19.4±2.2	18.2±0.5	57.5±3.2
Unknown	3	49.2±12.9	16.8±7.4	6.9±2.3	27.1±3.8