

## Phase, element, amino acid, structural composition of gallstones

© Olga A. Golovanova,<sup>1\*</sup> and Alexander N. Astakhov<sup>2</sup>

<sup>1</sup>*Inorganic Chemistry Division. F.M. Dostoevsky Omsk State University. Mir St., 55a. Omsk, 644077. Russia.*

*Phone: +7 (3812) 268-199. E-mail: gerksa\_11@mail.ru, golovanoa2000@mail.ru*

<sup>2</sup>*SRI «Nanotechnology and Nanomaterials». South-Russian State Technical University.*

*Prosvescheniya St., 132. Novocherkassk, 346428. Rostov Region. Russia.*

---

\*Supervising author; <sup>+</sup>Corresponding author

**Keywords:** *Gallstones, cholesterol, bilirubin, calcium carbonates, extraction department.*

### Abstract

Studying biominerals and biogenic mineral formation in live organisms is very important in biomineralogical research. A series of stones removed surgically from the patients of Regional hospital and Emergency Hospital of Omsk was investigated. By XRF and IR-spectroscopy methods it has been established that principal components of gallstones are: cholesterol (92% from the investigated collection); cholesterol with bilirubin component (6%); calcium carbonates of different modifications in cholesterol stones: aragonite, vaterite, calcite (16%) with predominance of vaterite modification (9%). The study of cholesterol obtained from the extraction department supplied us with more complete information about the composition of gallstones.