



Dr. Ippolitov



Dr. A.A. Kunin

## A Tooth Biopolymer May Provide a Basis for Physiologic Protection Against Caries

**A.A. Kunin, Y.A. Ippolitov, and E.G. Bykov**

Voronezh N.N. Burdenko State Medical Academy, Voronezh, Russia

### Background

The development of new, more effective methods to prevent caries is presently a high-priority issue in dentistry. In order to assess the efficacy of new preventive measures, it is necessary to take both the chemical composition of hard dental tissues as well as their structural and metabolic properties into account. Understanding the chemical, structural, and metabolic processes occurring in normal and diseased hard dental tissue

requires an understanding of the composite elements present in normal and diseased teeth, as well as the interconnections between the mineral substance and its organic matrix

### Materials and methods

Histochemical microslides were prepared from 10 human maxilla premolars that had been extracted because of orthodontic indications. Tooth sections were examined in transmitted light in order to analyze anodal protein topochemistry, specifically its distribution in enamel, dentine, and predentine structures, as well as in the cellular and noncellular cementum. The quantitative study was conducted using an apparatus constructed by E.G. Bykov (VSMA) called the Microtels-4, which enables microvideo capture within the limits of the selected areas

and calculates extinction sizes pointwise. Chromogenic screening was also performed. Readout areas with the required structures were delineated manually by a quadratic mode of operation, and calculation of statistical tables was conducted automatically after the selection of the measured area imaged on the display. To ensure representative sampling, we implemented the accumulated media method and we conducted the statistical analysis using the STX program.

### Results

We tested our hypothesis regarding the existence of anodal protein in hard dental tissue and analyzed its amino-acid composition. On the basis what is known about the histo- and cytogenesis of tooth structures and earlier results based on our examination of the partially keratinized squamous epithelium of the oral mucosa, we were able to confirm the presence of anodal protein in hard dental tissue using the newly developed sectioning and imaging technology described above in conjunction with bromphenol blue staining.

### Conclusions

The identification of biopolymers in hard dental tissues opens up new avenues for developing effective protective therapies to prevent the formation of dental caries.