

MICROBIOLOGY 2020: Bacillary-coccoid transformation activity of *Helicobacter pylori* (HP) in stomach mucosa**Viacheslav Kravtsov***Military Medical Academy, Russian Federation***Abstract:**

It is now generally accepted that HP is a gram-negative spiral-shaped bacterium with flagella. At the same time, the life cycle of bacterial cells of HP can include the stages of their transformation from bacillary (spiral) forms into coccoid forms and back, from coccoid to bacillary ones. According to immunocytochemical studies of gastro-biopsy specimens of HP-associated gastritis, the populations of HP bacterial cells living in the gastric mucosa contain spiral (90-95%), coccoid (3-7%) and intermediate U-forms (1-3%). Always available in the gastric mucosa HP coccoid forms provide the passage of HP bacterium through the intestinal tract and its output into the environment with excrements. During the peptic ulcer exacerbation, the activity of the bacillary-coccoid transformation of HP increases. As a result, the number of coccoid forms of HP in the ulcer can reach 50%. The activity of bacillary-coccoid transformation of HP in the gastric mucosa has a seasonal biorhythm and coincides with the periods of seasonal peptic ulcer exacerbation. HP coccoid forms have resistance to drugs and are one of the reasons for the inefficiency of eradication courses. The activity of bacillary-coccoid transformation of HP should be taken into account for meaningful eradication therapy and for the prevention of *Helicobacter pylori* infection.

The research of degree of incidence of genomic changes (of micronuclei) in mucous cells of gastric superficial-foveolar epithelium in contaminated and not contaminated mucous of stomach was made. Histopathological research of

micronuclei and *Helicobacter* was made in gastric biopsy specimen of patients with diagnosis-chronical gastritis (ICD-10K29.3) in group of patients who lived in radiation contaminated areas and in groups of people, who had no factors of radiation influence in anamnesis. People, who lived in the radiation contaminated areas, whose mucous was infected by *Helicobacter pylori*, had the highest frequency of mucous cells with micronuclei. In the group of patients from radiation contaminated areas with HP-associated gastritis frequency of appearance of mucous cells with micronucleus in the mucous of stomach have five times more, than patients, whose mucous of stomach was not infected ($p < 0.001$). Therefore, we can suggest, that *Helicobacter pylori* can success in mutagenic effect of radiation factor.

We present the results of bacterioscopic and immunocytochemical study of *Helicobacter pylori* in biopsy specimens from the gastric antrum and smears from the rectum. Predominance of spiral-shaped vegetative form of *Helicobacter pylori* in the antrum and the presence of cocci with *Helicobacter pylori* antigens in smears from the rectum were demonstrated in patients infected with *Helicobacter pylori*. The diagnostic sensitivity of non-invasive immunocytochemical *Helicobacter pylori* test in rectal smears was 90%, specificity 76%, and efficiency of the test 84%.

Lymphocytes with "tailed" nuclei (LTN) which are easily observed in routine smears of peripheral blood are a biological response to radiation. In this article, we describe LTN as a biomarker that has the same origin as dicentric chromosome. In emergency situations, we recommend to use this

simple biomarker in conjunction with hematological tests of the blood smears of the exposed persons

Sources of ionizing radiation are now widely used in all areas of human life, which dramatically increases the likelihood of radiological emergency and the possibility of radiation injury to people. According to IAEA data (2003), apart from the Chernobyl disaster, more than 430 major radiation incidents have occurred globally, resulting in at least 3,000 people suffering significant irradiation, 133 of these cases fatal. The most significant radiation accidents were Chernobyl disaster (Ukraine, 1986), the accident in Goiânia (Brazil, 1987), San Salvador (El Salvador, 1989), Tammiku (Estonia, 1994), Tokai-mura (Japan, 1999). Unfortunately, this sad trend continues in this century: the accident in the Samara Region (Russia, 2000), Lja (Georgia, 2001), Bialystok (Poland, 2001), etc. The accident at Fukushima-1 Nuclear Power Plant, Japan, in March 2011 also has had tragic and nasty consequences.