Commentary

The study of physiological, biochemical and pathogenic properties of sulfate-reducing bacteria (SRB) isolated from human and animal feces are focused on this habilitation thesis. As a consequence of this work, a conception of the functional role of SRB in the intestinal microbiota based on the ability of these microorganisms in the process of dissimilatory sulfate reduction to produce toxic metabolites that are a prerequisite for colon disease was developed. The microbiological, biochemical, biophysical methods and statistical processing of the results were used. The intestinal SRB, isolated from healthy and individuals with ulcerative colitis, were not differ statistically based on its physiological and biochemical properties. The ratio of dominant SRB, *Desulfovibrio* and *Desulfomicrobium* genera, was 93:7% in the feces of healthy people and 99:1% in the feces of people with ulcerative colitis. The main criteria for assessing the development and progression of an inflammatory process involving the intestinal SRB is: a change in microbial and colonic pH, bacterial enzyme activity, sulfate reduction, SRB growth rate and sulfate reduction intensity, hydrogen sulfide and acetate concentration in the feces. Prevention of this process can be accomplished by inhibiting two enzymes of the dissimilatory sulfate reduction process, particularly sulfite reductase and lactate dehydrogenase, which are the most sensitive side in intestinal SRB metabolism pathway.

The experimental results described in this work may be useful for a more detailed study of an inflammatory bowel disease with using a therapeutic strategy. Determining the number of SRBs and the hydrogen sulfide and acetate concentration allowed the development of basic criteria for assessing the aggressiveness of these bacteria, the toxic products of their metabolism to the intestinal mucosa as well as assessing the level of risk of the disease and the course of the inflammatory process. The work can be scientifically beneficial mainly because the results described are important for the study of ulcerative colitis in animal models, especially for the study of mechanisms of action of antimicrobials with prophylactic or therapeutic target of specific components involved in the pathogenesis of the disease. The study of the stability of selected strains of bacteria on antimicrobial and newly synthesized substances and also their influence on the physiological and biochemical properties of SRB allows the search for new and promising drugs. Such studies are promising in developing methods of preventing bowel disease.

In total, I have more 40 articles related to sulfate-reducing bacteria and problematic of this topic, but I have selected only 12 articles of the total number of publications. My contribution of these articles is summarized in the following tables with special attention to the experimental work, supervision of students, manuscript preparation and research direction.

1) Kushkevych I.; Fafula R.; Parák T.; Bartoš M. Activity of Na^+/K^+-activated Mg^{2+}-dependent ATP-hydrolase in the cell-free extracts of the sulfate-reducing bacteria *Desulfovibrio piger* Vib-7 and *Desulfomicrobium* sp. Rod-9. Acta Veterinaria Brno, 2015, 84: 3-12.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
30	20	70	10

2) Kushkevych I.; Kollar P.; Suchy P.; Parak T.; Pauk K.; Imramovsky A. Activity of selected salicylamides against intestinal sulfate-reducing bacteria. Neuro Enocrinology Letters, 2015, 36(1):106-113.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
30	10	60	-

3) Kushkevych I. Activity and kinetic properties of phosphotransacetylase from intestinal sulfate-reducing bacteria. Acta Biochemica Polonica, 2015, 62, 103-108.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
100	100	100	100

4) Kushkevych I. Kinetic Properties of Pyruvate Ferredoxin Oxidoreductase of Intestinal Sulfate-Reducing Bacteria *Desulfovibrio piger* Vib-7 and *Desulfomicrobium* sp. Rod-9. Polish Journal of Microbiology, 2015, 64(2), 107-14.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
100	100	100	100

5) Kushkevych I.; Kollar P.; Ferreira A.L.; Palma D.; Duarte A.; Lopes M. M.; Bartos M.; Pauk K.; Imramovsky A.; Jampilek J. Antimicrobial effect of salicylamide derivatives against intestinal sulfate-reducing bacteria. Journal of Applied Biomedicine, 2016, 14, 125-130.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
30	10	50	10

6) Kushkevych I.; Vítězová M.; Fedrová P.; Vochyanová Z.; Paráková L.; Hošek J. Kinetic properties of growth of intestinal sulphate-reducing bacteria isolated from healthy mice and mice with ulcerative colitis. Acta Veterinaria Brno, 2015, 86, 405-411.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
20	20	50	10

7) Kushkevych I.; Vítězová M.; Vítěz T.; Bartoš M. Production of biogas: relationship between methanogenic and sulfate-reducing microorganisms. Open Life Sciences, 2017, 12, 82-91.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
20	10	60	10

8) Kushkevych I.; Vítězová M.; Kos J.; Kollár P.; Jampílek J. Effect of selected 8-hydroxyquinoline-2-carboxanilides on viability and sulfate metabolism of *Desulfovibrio piger*. Journal of Applied Biomedicine, 2018, 16(3), 241-246.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
30	10	50	10

9) Kushkevych I.; Kováč J.; Vítězová M.; Vítěz T.; Bartoš M. The diversity of sulfate-reducing bacteria in the seven bioreactors. Archives of Microbiology, 2018, 200, 945-950.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
10	10	70	10

10) Kushkevych I.; Kos J.; Kollar P.; Kralova K.; Jampilek J. Activity of ring-substituted 8-hydroxyquinoline-2-carboxanilides against intestinal sulfate-reducing bacteria *Desulfovibrio piger*. Medicinal Chemistry Research, 2018, 27(1), 278-284.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
30	10	60	-

11) Kushkevych I.; Dordević D.; Vítězová M.; Kollár P. Cross-correlation analysis of the *Desulfovibrio* growth parameters of intestinal species isolated from people with colitis. Biologia, 2018, 73(11), 1137–1143.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
30	10	50	10

12) Kushkevych I.; Dordević D.; Vítězová M. Toxicity of hydrogen sulfide toward sulfate-reducing bacteria Desulfovibrio piger Vib-7. Archives of Microbiology, 2019, 201, 1-9.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
10	10	70	10