УДК 640

EFFECTS OF RUMEX TIANSCHANICUS LOSINSK EXTRACT ON GI TRACT AND HEMATOLOGICAL INDICATORS IN EXPERIMENTAL GASTRITIS

D.M. Yergozova, I.B. Ginayatova, A.K. Shokan, N.O. Kudrina, T.Y. Kulmanov

Republican State Enterprise on the Right of Economic Management «INSTITUE OF GENETICS AND PHISIOLOGY» Science Committee of the Ministry of Education and Science of the RK, Al-Farabi Kazakh National University, Almaty, Kazakhstan

The gastritis and gastrointestinal diseases problem has not lost relevance at present because of the disease's significant prevalence. The five most frequent diseases worldwide include gastrointestinal tract disorders. And of the whole number of gastrointestinal conditions, gastritis is the most frequent and about 30 percent of the people worldwide are caused by peptic ulcer [1]. Around half of people globally are supposed to suffer from gastritis. With age the incidence rate is higher [2]. There were approximately 90,000 new cases reported in 2013 [3]. Statistics for 2020 indicate that 50,8 percent of developing countries' population worldwide is affected with gastritis [4,5]. This means that every year the numbers increase.

Our research suggests using Tien Shan sorrel extract as an alternate therapy for gastritis. It was used in folk medicine to treat gastrointestinal and liver diseases, as well as a variety of skin disorders. It contains anthracene derivatives, tannins, flavonoids, naphthols, macro – and microelements, catechins, saponins, alkaloids, and polysaccharides, all of which have various therapeutic properties [6].

Rumex tianschanicus is a rumex species native to Kazakhstan. According to T. Sitpaeva (2019), *Rumex tianschanicus* is one of the wild agricultural crop varieties found in Kazakhstan's Tien Shan Mountains, and it is recommended for harvesting as an industrial crop alongside other species. [7]

Currently, one of the possible approaches to increasing the effectiveness of the treatment of many diseases is the use of drugs obtained from medicinal plant materials. During our study, 45 rats weighing 250±50 grams were split into two groups: The control group got placebo, whereas the experimental group received acetylsalicylic acid 160 mg/kg orally once a day for 5 days to induce acute experimental gastritis. Then experimental rats were split into three groups and given *Rumex tianschanicus* extract after being diagnosed with gastritis. For ten days, the first group was administered 100 mg/kg orally once a day, the second group was given 50 mg/kg orally once a day. The extract was not given to the third group. At the conclusion of the research, all of the animals were sacrificed to assess cytological, histological, macro changes in the GI tract and hematological indices.

The macro photographs of the mucous membrane of the stomach were taken and the condition of the gastrointestinal tract was assessed. Aspirin-induced stomach mucous membrane inflammation is characterized by small erosions (1–5 mm) and hyperemia. As a result, rats eat less frequently and weigh less than previously. On the fifth day of treatment with extract, the color of the stomach mucous membrane returned to normal. The rats' condition has stabilized as a result of the treatment.

Rumex tianschanicus extract was shown to decrease aspirin-induced gastritis and normalize rat hematological indicators in a research. Overall, the data confirmed *Rumex tianschanicus* extract's positive and non-toxic effects in reducing stomach ulcer formation in experimental acute gastritis rats, indicating that it may be used as a gastritis alternative therapy.

The *Rumex tianschanicus* extract has no pathological effect on peripheral blood and hemopoiesis during the period of its use, according to the results of a study conducted to assess the pharmacological properties of the Rumex tianschanicus extract and its potential effect on the hematological parameters of rats during the treatment of experimental gastritis. In this regard, Rumex tianschanicus extract is advised for additional in-depth research in experimental conditions, followed by a transfer to clinical trials.

References

1. Snowden F.M. Emerging and reemerging diseases: a historical respective / F.M. Snowden // Immunol. – 2008. – Rev., 225 (1). – P. 9–26.
2. Ferri F.F. Ferri's Clinical Advisor 2013, 5 Books in 1, Expert Consult – Online and Print / F.F. Ferri // Elsevier Health Sciences. – 2012. – P. 165–178.
3. Vos T. Allen C. Arora M., et al. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013 / T. Vos, C. Allen, M. Arora, et al. // The Lancet. – 2015. – Vol. 386, Iss. 10053. – P. 1545–1602.
4. Evelyn P.T., Fernanda F.M., Mayra P.D., Luiz O.M., Marcela A.P., Viviane S.B., et al. Epidemiological and clinical-pathological aspects of helicobacter pylori infection in brazilian children and adults / P.T. Evelyn, F.M. Fernanda, P.D. Mayra, O.M. Luiz, A.P. Marcela, S.B. Viviane, et al. // Gastroenterology Research & Practice. – 2018. – Vol.2018. – P.8–16.
5. Marcis L., Olga S., Jelizaveta P., Yaron N. Epidemiology of Helicobacter Pylori Infection / L. Marcis, S. Olga, P. Jelizaveta, N. Yaron // Wiley Helicobacter. – 2018. – Vol. 23(1). – e12514.
6. Litvinenko .A., Begimbetova D.A., Shalahmetova T.M., Muzychkina R.A. Gipatoprotektornaя aktivnost fitopreparatov nekotoryh kazahstankih vidov avelei / .A. Litvinenko, D.A. Begimbetova, T.M. Şalahmetova, R.A. Muzychkina // İzvestiя Nasionalnoi akademii nauk Respubliki Kazahstan. Seriя himicheskaя. – 2007. – № 2. – S. 26–28.
7. G.T. Sitpayeva, G.M. Kudabayeva, L.A. Dimeyeva, N.G. Gemejiyeva, P.V. Vesselova. Crop wild relatives of Kazakhstani Tien Shan: Flora, vegetation, resources / Sitpayeva G.T., Kudabayeva G.M., Dimeyeva L.A., Gemejiyeva N.G., Vesselova P.V. // Plant Diversity. – 2020. – Vol.42, Iss.1. – P. 19–32.

УДК 616–006–092.9

ИНГИБИРОВАНИЕ МЕТИЛТРАНСФЕРАЗЫ SET7/9 ПОВЫШАЕТ ЧУВСТВИТЕЛЬНОСТЬ РАКОВЫХ КЛЕТОК К ГЕНОТОКСИЧЕСКОЙ ТЕРАПИИ

А.А. Дакс, О.Ю. Шувалов, О.А. Федорова, А.В. Петухов, Н.А. Барлев

Институт цитологии РАН, Санкт-Петербург, Россия

Белок человека Set7/9 представляет собой гистоновую и негистоновую метилтрансферазу, которая способна метилировать гистоны III, H3 и ряд белков, играющих ключевые роли в регуляции пролиферации клеток, ответе на повреждение ДНК, а также опухолевой трансформации, таких как p53, PARP1, E2F1 и другие. В рамках данного исследования мы продемонстрировали, что Set7/9 осуществляет регуляцию метаболизма раковых клеток и влияет на их туморогенные характеристики.

Мы протестировали клеточные линии немелкоклеточного рака легкого (НМРЛ) человека H1299, A549 и H1975 с нокдауном Set7/9 на скорость пролиферации и показали, что подавление Set7/9 приводит к увеличению пролиферативной активности исследуемых клеток. Также в результате анализа клеточного цикла мы продемонстрировали, что нокдаун Set7/9 приводит к увеличению S-фазы, что согласуется с данными тестов пролиферации.

Предположив, что Set7/9 может влиять на метаболический статус клеток НМРЛ, мы проанализировали митохондриальный мембранный потенциал (ММП) клеток H1299, A549 и H1975 с различным статусом данного фермента. Мы показали, что клетки со сниженным уровнем Set7/9 характеризуются повышенным уровнем ММП. В результате исследования влияния Set7/9 на уровень гликолитических ферментов как на уровне мРНК, так и на уровне белка, было показано, что подавление Set7/9 приводит к повышению ключевых гликолитических ферментов – лактатдегидрогеназы LDHA, альдолазы AldoA, гексокиназы (HK2), а также переносчика глюкозы (Glut1), что объясняет влияние Set7/9 на скорость пролиферации клеток.

Таким образом, мы показали, что метилтрансфераза Set7/9 регулирует пролиферацию раковых клеток, а подавление Set7/9 вызывает повышение уровня гликолиза и способствует формированию агрессивного ракового фенотипа.

Работа выполнена при поддержке гранта РНФ № 19–75–10059.