Biological activity of the mummy. Publication 3: Effects on the gastrointestinal tract. Antiulcer, hepatoprotective, choleretic action

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I. Results of studying the effect of mummy on the gastrointestinal tract

The effect of the mummy on the gastrointestinal tract is described by Avicenna in the "Canon of Medical Science" in the section "Food Organs":azhgona and caraway seeds. For hiccups they give one khabba [mummy] in a decoction of celery seeds, and for pain in the spleen - one kirat with sugar water "[2].

For the first time in the twentieth century, the effect of mummy on the secretory function of the stomach was described in worksH.S. Sanginova (1965-1969) [20, 21]. The experiments were performed on dogs with isolated stomachs under mixed feeding conditions 17–18 hours after feeding. The required dose of mummy was previously dissolved in 150 ml of tap water at a temperature of 35–36 ° C and introduced through a gastric tube into the stomach. Then, every 30 minutes for 3 hours, the amount of secretion, total and free acidity of gastric juice were determined in a dynamic sequence.

As a result, it was shown that the introduction of mummy into the stomach of dogs at doses of 10–20 mg / kg without food stimulus and in combination with it did not affect the secretion, total and free acidity of gastric juice. The drug in doses of 50-100 mg / kg without food irritant and in combination with it caused a significant increase in secretion, total and free acidity of gastric juice. The drug in doses of 50–100 mg / kg in combination with a food irritant gave a more pronounced effect compared to its administration with water without food irritant [20, 21].

The same point of view is shared by E.T. Shishkov (1971) [30]. Experimental (on rats and mice) and clinical studies carried out on the basis of the Tashkent Institute for Advanced Medical Studies and the Central Hospital of the Ministry of Internal Affairs, made it possible to establish that short-term administration (within 10 days) of subtoxic doses (50 mg / kg) of Bostandyk mummy enhances the secretion of the gastrointestinal mucosa. -intestinal tract, which is promising in the treatment of anacid gastritis [30].

H.S. Sanginov (1965-1969) [20, 21] studied the effect of mummy on an isolated intestine against the background of exposure to acetylcholine, histamine, serotonin and diphenhydramine. For this, sections of the intestine were immersed first in Tyrode's solution, then in the test substance (acetylcholine, histamine, serotonin, and diphenhydramine) and again in Tyrode's solution. Then the intestines were placed in a solution of mummy with a concentration of 1 mg / ml, then in Tyrode's solution and in the test substance [20]. Against the background of the action of acetylcholine, serotonin, diphenhydramine and histamine, mummy reduced the contractile functions of the small intestine, which indicated its certain sympatholytic effect. At the same time, it was shown that mummy does not have cholinomimetic and serotonin-like effects [20].

M.N. Maksumov and V.A. Karimov (1965), it was found that mummy in doses of 10–20 mg / kg has an inhibitory effect on the motility of the small intestine, isolated from a rabbit by the method of Nikolaev and Subbotin. Shilajit has the same depressing effect on the motility of the large intestine, which is associated with its papaverine-like myotropic properties [12].

IN AND. Kozlovskaya et al. (1972) on the isolated (according to the Magnus method) small intestine of a rabbit, the effect of mummy (at a concentration of 0.01; 0.05; 0.1; 1.0; 2.0; 3.0; 4.0 mg / ml) on peripheral nerve structures and smooth muscles. For this, sections of the rabbit's small intestine were taken at the time of death of the animal and kept in Tyrode's solution at a temperature of + 4 -C for 24 hours. The solution was continuously saturated with air, and the constancy of the temperature of the solutions was maintained in a water bath with automatic heating [10]. Shilajit at a concentration of 0.01 and 0.05 mg / ml did not change the number and amplitude of intestinal contractions. At a dose of 3.0 and 4.0 mg / ml, it caused suppression of the function of intestinal smooth muscles, which was accompanied by a decrease in fluctuations and a drop in muscle tone. At a dose of 2.0 mg / ml, it significantly increased the amplitude of contractions of intestinal smooth muscles [10].

YES. Abduraimov and T.R. Abdurakhmanov (1972) investigated the effect of the preparation mumiyo on the nervous apparatus of the pancreas. For this purpose, experimental cats and dogs were injected subcutaneously for 10 days once a day with mummy at the rate of 100 mg / kg of body weight. In experimental animals from the side of the nervous apparatus of the pancreas were noted: hyperargyrophilia, in places

neuroplasma, tortuosity of nerve fibers, intensity of coloration of lamellar bodies with a well-defined inner bulb; Schwann cells were increased in volume, they easily and quickly perceived silver. In the ganglia, hyperargyrophilia was also noted. Thus, the ability of shilajit was shown to increase the reactivity of the nervous apparatus of the pancreas [1].

Research by Yu.N. Nuraliev (1973), performed on the whole body of animals, indicate that the drug in doses of 50-200 mg / kg did not change the rate of movement of the colored contents of the stomach and intestines, and in large doses (1000 mg / kg) significantly accelerated the movement of the contents of the gastrointestinal tract. -intestinal tract. The authors attributed this to the local irritating effect of the drug [16].

In the later works of Yu.N. Nuraliev and P. Denisenko (1977) studied the effect of mummy on the tone of the small intestine on catsin situ [17]. The drug, administered intravenously at doses of 50–300 mg / kg, did not change the effects that occur with the administration of acetylcholine, atropine, as well as with irritation of the vagus nerve; at doses of 50-200 mg / kg did not affect the rate of advancement of the colored contents of the stomach and intestines, and at higher doses (1000 mg / kg) accelerated the advancement of the contents of the gastrointestinal tract [17]. Experiments on isolated strips of rat stomach, sections of rabbit intestines, and isolated rat uterus showed that mummy only in dilutions of 1: 500–1: 5000 completely inhibits rhythmic contractions and causes agony of the isolated intestine, stomach, and uterus [17].

The mineral fraction of mummy, in contrast to the whole product, caused a complete relaxation of the tone of the isolated intestine and stomach in dilutions of 1: 5000. The albumin fraction, even at 1: 100 dilutions, did not change the tone of smooth muscle organs. Shilajit at a concentration of 1: 2000 completely prevented, and at a concentration of 1: 20000 - by 40–80% prevented serotonin or histamine spasm of an isolated strip of rat stomach and an isolated section of rabbit intestine [17].

Thus, the inhibitory effect of mummy on intestinal tone is mainly associated with the direct effect of the drug on the smooth muscle elements of the intestinal wall, as well as with the blockade of histamine-serotonergic structures of the intestine [17].

II. Results of the study of antiulcer activity

For the first time, the positive antiulcer effect of mummy in experimental ulcers of chemical etiology in rats was discovered by A.I. Leskov et al. in 1965 [11]. In the experiment, it was shown that oral administration of mummy at a dose of 250 mg / kg for 14 days has an antiulcer effect. The coefficient of ulceration in rats with stomach ulcers caused by the method of K.A. Meshcherskaya, decreased from 1 in the control to 0.04 against the background of the use of mummy. In rats with stomach ulcers caused by the method of I.A. At the factory, the ulceration rate decreased from 0.4 in the control to 0.05 in the treated rats. Shilajit at a dose of 150 mg / kg under the same experimental conditions did not have an antiulcer effect [11].

S.L. Gokhberg et al. (1978) studied the therapeutic effect of mummy in ulcerative colitis in an experiment on rats with ulcerative lesions of the colon caused by the introduction of phenol [6]. It was found that the treatment with mumiyo (at a dose of 300 mg / kg) of animals with experimental lesions of the colon decreases the frequency of ulcerative organ lesions. However, histological examination of the colon mucosa (in animals with non-ulcerative lesions) did not reveal any changes indicating reparation. Thus, it was shown that in ulcerative colitis, mumiyasil should be used in combination with other drugs [6].

The effect of mummy on the gastric mucosa in experimental rat ulcers has been studiedR.M. Muminova et al. (1978) using the generally accepted arsenic-caffeine model [13].

It is known that arsenic-caffeine ulcers lead to pronounced dystrophic changes in the body of experimental animals. In the experiment, it was shown that mummy can be attributed to agents that stimulate reparative regeneration in experimental gastric ulcers in experimental animals (confirmed by pathomorphological indicators) and possess adaptogenic and antitoxic effects [13]. The antiulcer activity of mummy has been studied in sufficient detail by Yu.N. Nuraliev et al. (1968-1977) [15-18]. In experiments on white rats, it was revealed that the antiulcer effect of mummy is the leading one in the action of the drug, but it manifests itself in different ways depending on the nature and pathogenesis of the models of experimental ulcers used in the work [16].

So, if ulcers were caused by slow and prolonged exposure to ulcerogenic agents

(arsenic-caffeine, histamine, neurogenic-immobilization and multifactorial pathogenesis), then the introduction of mummy in doses of 25-3000 mg / kg had a pronounced therapeutic and prophylactic effect [15-18].

With stress ulcers caused by the method of I.S. Factory, the effect of the mummy depended on the amount of the administered dose. The drug in high doses (1000 mg / kg) prevented the occurrence of degenerative changes, but did not improve the reparative processes. The drug in medium doses (50–300 mg / kg) had a pronounced therapeutic effect [15–18].

In order to elucidate the mechanism of the therapeutic and prophylactic effect of mummy on dystrophic processes, the author determined the content of catecholamines in the stomach wall of rats with experimental ulcers. Shilajit in large doses (1000 mg / kg) caused a decrease in the amount of catecholamines - norepinephrine and adrenaline (0.07 ± 0.002 and 0.13 ± 0.006, respectively) in the stomach wall in rats with experimental ulcers (at 0.11 ± 0.001 and 0 , 18 ± 0.012, in control). Shilajit in medium doses (50-300 mg / kg) increased the content of norepinephrine and adrenaline in the stomach wall in rats with experimental ulcers (0.21 ± 0.001 and 0.27 ± 0.002, respectively).

As a result of the studies, the authors identified the main factor in the mechanism of the therapeutic action of mummy in various experimental ulcers [16]. It was also shown that the pronounced therapeutic effect of mummy in small doses (25–50 mg / kg) is due to its positive effect on the metabolism of catecholamines, the lack of which in the stomach wall usually leads to tissue degeneration. The mechanism of prophylactic antiulcer action of mummy in large doses (1000 mg / kg) is associated with the fact that the drug suppresses the activity of adrenoreactive structures and, thus, protects them from overexcitation by a large amount of catecholamines formed during extreme irritation [16]. Thus, the participation of mummy in sympathetic innervation not only in the form of an adrenopositive effect, but also in the formation of mediators of the sympathetic system has been experimentally proved [17].

III. Results of studying hepatoprotective activity

The first mentions of the hepatoprotective activity of mummy are found in the treatise of Tibetan medicine "Chzhud-shi", where it is indicated that it helps with "heat of the liver" [29]. In 1972-1973 research by Yu.N. Nuralieva et al. it was shown a positive effect of mummy on liver function [16, 19], manifested in a slight increase in the glycogen content in the liver (from 10 ± 1% to 15 ± 22%), both with a single and with systematic repeated administration of mummy in doses of 25–500 mg / kg.

Later studies by Yu.N. Nuralieva et al. (1977) made it possible to establish the positive effect of mummy on the metabolism of glycogen in the liver also with single and multiple administration [17]. However, a single injection of the drug at doses of 50–1000 mg / kg did not cause significant changes in the glycogen content. The content of the latter in the liver of animals receiving mummy at a dose of 25, 50 and 500 mg / kg once a day for 1 month was higher than in the control. At the same time, a statistically significant increase was observed only in the experiment with the introduction of mummy at a dose of 50 mg / kg, where the glycogen content was 13 ± 2 g%, relative to 9 ± 0.6 g% in the control [17].

Yu.K. Vasilenko et al. (1972) on white rats, the effect of the Caucasian mummy on experimental toxic hepatitis caused by six-fold subcutaneous administration of carbon tetrachloride was studied. An aqueous solution of mummy was injected in the amount of 75 mg / kg of body into the stomach for three weeks [3]. Studies have shown that in sick animals, tissue respiration in the liver was clearly reduced, but increased in the small intestine. Under the influence of mummy, the value of the respiratory coefficient was restored in the tissues of the liver, stomach and small intestine [3].

Oral use of mummy in conditions of liver pathology promoted a mild activation of compensatory processes without a noticeable restoration of structural disorders in its tissue [3]. The results of these studies were subsequently confirmed by other researchers.

T.M. Mukhamedov et al. (1980) studied morphofunctional changes in primary (carbon tetrachloride poisoning) and secondary enterogenous (experimental ulcerative colitis) liver damage [14]. The experiments were carried out on white rats with toxic liver damage caused by subcutaneous injection of carbon tetrachloride at the rate of 0.12 ml / 100 g every other day for 25 days. Ulcerative lesions of the colon were caused by oral administration of phenol at a dose of 30 mg / kg and three times administration of antigen isolated from the intestinal mucosa of intact rats mixed with Freund's complete adjuvant. During the period of repair after the cessation of poisoning with carbon tetrachloride and phenol, mummy was administered at a dose of 50, 150, 300 and 500 mg / kg every other day in

within 30–35 days [14].

In healthy rats, mummy promoted an increase in the formation and release of β-lipoproteins into the blood serum; an increase in autolipolytic activity, oxygen absorption and the release of carbon dioxide by the hepatic tissue. With toxic damage to the liver, mummy caused an improvement in the glycogen and protein-forming functions of the liver. However, even at a dose of 500 mg / kg, the disturbed structure of the hepatic tissue was not restored: fatty degeneration persisted in the cytoplasm of hepatocytes and there was no resorption of connective tissue in the hepatic lobules, where small necrotic foci were found with a high frequency [14].

In animals with lesions of the colon caused by phenol, mummy had a positive effect on metabolic and structural changes in the liver. This was expressed in the normalization of the glycogeno- and protein-forming function of the liver, an improvement in the proteolysis coefficient, as well as an increase in liver autolipolysis, the formation and release of β-lipoproteins in the blood serum. However, complete normalization of structural changes in the liver tissue did not occur. The properties of mummy as a stimulator of regeneration were most clearly manifested in the treatment of secondary hepatitis arising from ulcerative lesions of the colon [14].

Researchers from the Federal Scientific and Practical Center of the Ministry of Health of the Russian Federation (1995–1999) [5, 22, 23, 25–28] were the first to study the antitoxic and antioxidant activity of a standardized extract of dry mummy (VFS 42-3084-98) [4] obtained from raw materials various deposits.

The studies were carried out on a model of acute carbon tetrachloride hepatitis in male rats, divided equally into 4 groups: intact, two experimental and control. Acute hepatitis was caused by a single intragastric administration of carbon tetrachloride at a dose of 0.3 ml / 100 g of animal weight, diluted with sunflower oil (1: 1). An aqueous solution of dry mummy extract at doses of 100 and 250 mg / kg was administered to rats of the experimental groups per day and for 30 minutes. before the introduction of carbon tetrachloride. Control animals received only carbon tetrachloride [5, 22, 23, 25–28].

The detoxifying function of the liver was judged on the basis of data obtained using the hexenal test. 18 hours after the introduction of carbon tetrachloride, the animals of all groups were injected intraperitoneally with hexenal at a dose of 65 mg / kg and the time spent in the lateral position was recorded [5, 22, 23, 25–28].

As a result of the study, it was shown that preliminary (prophylactic) administration of dry mummy extract to animals of the experimental groups reduces the toxic effect of carbon tetrachloride by 27.85% (at a dose of 100 mg / kg) and 35.23% (at a dose of 250 mg / kg) by compared with control [5, 22, 23, 25-28].

After the end of the experiment, the rats were sacrificed by decapitation, and the blood and liver were taken for biochemical studies. In the blood serum of animals of all groups, the activity of the following enzymes was determined: transaminases (alanine aspartate aminotransferase, gamma-glutamate transferase) and hydrolases (alkaline phosphatase), since the degree of increase in enzyme activity indicates the severity of damage to parenchymal liver cells [5, 22, 23, 25-28] ...

In the experiment, the introduction of dry mummy extract at doses of 100 and 250 mg / kg inhibited the increase in the activity of serum enzymes by 11.05-23.31% compared to the control, which indicates its hepatoprotective effect. No significant effect of dry mummy extract on the activity of alkaline phosphatase was observed under these experimental conditions [5, 22, 23, 25–28].

IV. The results of the study of choleretic activity

The choleretic activity of mummy was studied by A.I. Leskov et al. (1965) on anesthetized cats by catheterization of the common bile duct. It was shown in the experiment that the introduction of mummy into the duodenum at a dose of 80 mg / kg does not affect bile secretion [11]. With an increase in the dose to 250 mg / kg, a pronounced choleretic effect was observed. During the first hour after the introduction of the mummy, the outflow of bile increased by 94%, after 2 hours the secretion of bile exceeded the initial one by 77%, after 3 hours - by 43% and after 4 hours - by 14%. A higher dose of mummy (400 mg / kg) caused a decrease in bile secretion by 5-10% [11].

The FNCEC TMDL of Roszdrav (1995-1999) [5, 22, 23, 25-28] first studied the effect of a standardized extract of dry mummy (VFS 42-3084-98) [4] on exocrine liver function in acute experiments on rats - males by the method of N.P. Skakun and A.N. Oleinik. Animals under urethane anesthesia were opened the abdominal cavity, polyethylene cannulas were inserted into the common bile duct, and the animals were left for a 40-minute rest with a free outflow of bile. After resting, bile was collected hourly into graduated tubes. The amount of bile collected in 1 hour

served as the initial background. Dry mummy extract was administered intraduodenally at doses of 250–500 mg / kg in a volume of 0.5 ml / 100 g of animal weight. The collection of bile after the introduction of the dry mummy extract was carried out for 4 hours. The amount of bile collected for each hour of the experiment was used to calculate the rate of its secretion, which was expressed in milligrams per minute per 100 g of rat weight [5, 22, 23, 25–28].

As a result of the conducted studies, a dose-dependent choleretic effect of dry mummy extract was established, characterized by an increase in the intensity of bile secretion in the first hour after administration by 17.14% (at a dose of 100 mg / kg) and 26.67% (at a dose of 500 mg / kg) compared with the initial level [5, 22, 23, 25–28].

The results of the studies [5, 22, 23, 25-28] allowed us to conclude that the standardized dry mummy extract has pronounced antitoxic (hepatoprotective) properties, combined with choleretic activity. However, the mechanism of this action of dry mummy extract is still unclear.

V. Discussion of results

The results of the information and analytical research carried out were summarized by us in Table 1.

Despite a significant amount of work on the study of the effect of mummy preparations on the gastrointestinal tract, the assessment of their antiulcer, hepatoprotective and choleretic biological activity, until the end of the 20th century there was no clear idea of their medicinal properties. Until 1995 [5, 7–9, 22–28], works represented a certain set of specific information about certain properties of mummy of various quality and degree of purification. Almost no work presented at least a brief description of the research object: the name of the drug; deposit of raw materials used to obtain the drug; the way to clean it; concentration of the drug and methods of its administration; models used in the experiment; experiment technique. Hence, probably, and some one-sidedness of the work and the low comparability of the research results.

Table 1

Results of studying the effect of mummy on the gastrointestinal tract, its antiulcer, hepatoprotective, choleretic activity

№ п/п	Вид фармакологической активности	Автор исследования, библиографическая ссылка	Год	Характеристика объекта исследования				Результаты исследований
				Название препарата и его концентрация	Способ и дозы введения	Опытные животные или объект исследования	Место отбора проб мумиё	
1.	Влияние на желудочно-кишечный тракт	**Х.С. Сангинов** [20, 21]		Мумиё	Внутрижелудочно через зонд, дозах 10–20 мг/кг и 50–100 мг/кг	Собаки	Не указано	В дозах 10–20 мг/кг без пищевого раздражителя и в сочетании с ним не влияет на секрецию, общую и свободную кислотность желудочного сока. Препарат в дозах 50–100 мг/кг без пищевого раздражителя и в сочетании с ним вызывает увеличение секреции, общей и свободной кислотности желудочного сока.
		Е.Т. Шишкова [30]		Мумиё	30 мг/кг	Крысы, мыши	Бостан-дыкское	Усиливает секрецию слизистой оболочки ЖКТ.
		Х.С. Сангинов [20, 21]		Водный раствор мумиё в концентрации 1 мг/мл		Изолированный кишечник	Не указано	На фоне действия ацетилхолина, серотонина, димедрола и гистамина уменьшает сокращение тонкого кишечника. Обладает спазмолитическим, холинолитическим и серотонинподобным действием.
		М.Н. Максумов и В.А. Каримов [12]		Мумиё	10–20 мг/кг	Тонкий отдел кишечника, изолированный у кролика	Не указано	Тормозящее действие на моторику тонкого отдела кишечника. Обладает папаверинподобным миотропным действием.
		В.И. Козловская с соавт. [10]		Водный раствор мумиё в концентрации 0,01; 0,05; 0,1; 2,0; 3,0; 4,0 мг/мл		Тонкий кишечник, изолированный у кролика	Не указано	В концентрации 0,01 и 0,05 мг/мл не изменяет количество и амплитуду сокращений кишечника. В концентрации 3,0 и 4,0 мг/мл вызывает угнетение функции гладкой мускулатуры кишечника, сопровождающееся уменьшением колебаний и падением мышечного тонуса. В концентрации 2,0 мг/мл увеличивает амплитуду сокращений гладкой мускулатуры кишечника.
		Д.А. Абдурахимов и Т.Р. Абдурахманов [1]		Препарат мумиё	100 мг/кг	Кошки, собаки	Не указано	Мумиё повышает реактивность нервного аппарата поджелудочной железы.
		Ю.Н. Нуралиев [16]		Водный экстракт мумиё	Дозы 50–200, 1000 мг/кг	Целый организм животных	Средняя Азия, Забайкалье	В дозе 50–200 мг/кг не изменяет скорость продвижения окрашенного содержимого желудка и кишечника. В дозе 1000 мг/кг ускоряет продвижение содержимого желудочно-кишечного тракта.
		Ю.Н. Нуралиев и П. Денисенко [17]		Водный экстракт мумиё	Внутривенно в дозах 50–300, 1000 мг/кг	Кошки	Средняя Азия,	В дозах 50–300 мг/кг не изменяет эффектов, возникающих при введении ацетилхолина, атропина, при раздражении блуждающего нерва. В дозах 50–200 мг/кг не изменяет скорость продвижения окрашенного содержимого желудка и кишечника. В дозе 1000 мг/кг ускоряет продвижение содержимого желудочно-кишечного тракта.
					Разведения 1:500 и 1:5000	Изолированные полоски желудка крыс, отрезки кишечника кроликов, изолированные матки крыс	Забайкалье	В указанных разведениях при местном применении полностью угнетает ритмические сокращения и вызывает атонию изолированного кишечника, желудка и матки.

2.	Противоязвенная активность	**А.И. Лесков** [11]	1965	Мумиё	Внутрь в дозах 250 мг/кг	Крысы	Не указано	В дозах 250 мг/кг обладает противоязвенным действием (коэффициент изъязвления снижается с 1 до 0,04 – при язвах, вызванных по методу К.А. Мещерской). В дозах 150 мг/кг не обладает противоязвенным действием.
		С.Т. Гохберг с соавт. [6]	1978	Мумиё	300 мг/кг	Крысы	Не указано	Уменьшает частоту язвенных поражений толстого кишечника.
		Ю.Н. Нуралиев с соавт.[15–18]	1968–1977	Водный экстракт мумиё	Доза 25–3000 мг/кг	Белые крысы	Средняя Азия, Забайкалье	В дозах 25–3000 мг/кг при язвах, вызванных ульцерогенным агентом, оказывает выраженное лечебное и профилактическое действие. В дозе 1000 мг/кг при стрессорной язве предупреждает возникновение дистрофических изменений, но не улучшает репаративных процессов. В дозах 50–300 мг/кг при стрессорной язве оказывает лечебное действие.
		Р.М. Муминова [13]	1978	Мумиё	Не указана	Не указаны	Не указано	Стимулирует репаративную регенерацию.
3.	Гепатопротекторная активность	**Ю.Н. Нуралиев с соавт.** [16, 19]	1972–1973	Водный экстракт мумиё	Доза 25–500 мг/кг	Не указаны	Средняя Азия, Забайкалье	Повышает содержание гликогена в печени при однократном и многократном введении
		Ю.Н. Нуралиев с соавт. [17]	1977	Водный экстракт мумиё	Доза 25–1000 мг/кг	Не указаны	Средняя Азия, Забайкалье	Положительное влияние на обмен гликогена в печени.
		Ю.К. Василенко [3]	1972	Водный раствор мумиё	Доза 75 мг/кг внутрижелудочно	Белые крысы	Не указано	Способствует слабовыраженной активации компенсаторных процессов в печени без заметного восстановления структурных нарушений в тканях печени.
		Т.М. Мухамедов с соавт.[14]	1980	Препарат мумиё	50, 150, 300 и 500 мг/кг	Белые крысы	Не указано	У здоровых крыс способствует повышению образования и выхода в сыворотку крови β-липопротеидов; увеличению аутолитической активности, поглощению кислорода и выделения углекислоты печёночной тканью. При токсическом поражении печени мумиё вызывает улучшение гликогено- и белкообразовательной функции печени. У животных с поражением толстой кишки нормализует гликогено- и белкообразовательную функции печени, улучшает коэффициент протеолиза, усиливает аутолитолиз печени.
		Фролова Л.Н. с соавт. [5, 22, 23, 25–28]	1995–1999	Стандартизованный экстракт мумиё сухой (ВФС 4203084-98)	Водный раствор экстракта мумиё сухого в дозах 100 и 250 мг/кг	Крысы	Горный Алтай, Южная Якутия, Юго-Западная Тува, Восточный Памир, Юго-Западный Тянь-Шань, Центральный и Восточный Казахстан, Монголия	Профилактическое введение уменьшает токсическое воздействие тетрахлорметана на 27,85% (в дозе 100 мг/кг) и 35,23% (в дозе 250 мг/кг) по сравнению с контролем. В дозах 100 и 250 мг/кг тормозит нарастание сывороточных ферментов на 11,05–23,31% по сравнению с контролем.
4.	Желчегонная активность	**А.И. Лесков** [11]	1965	Препарат мумиё	Доза 80, 250, 400 мг/кг в двенадцати-перстную кишку	Кошки	Не указано	В дозе 80 мг/кг не влияет на желчеотделение. В дозе 250 мг/кг наблюдается выраженное желчегонное действие. Доза 400 мг/кг вызывает уменьшение желчеотделения на 5–10%.
		Фролова Л.Н. с соавт. [5, 22, 23, 25–28]	1995–1999	Стандартизованный экстракт мумиё сухой (ВФС 4203084-98)	Доза 250–500 мг/кг интродуоденально	Крысы-самцы	Горный Алтай, Южная Якутия, Юго-Западная Тува, Восточный Памир, Юго-Западный Тянь-Шань, Центральный и Восточный Казахстан, Монголия	Увеличение интенсивности желчеотделения в первый час после введения на 17,14% (в дозе 100 мг/кг) и 26,67% (в дозе 500 мг/кг) по сравнению с исходным уровнем.

Vi. Conclusion

Thanks to a set of targeted studies on the development of criteria for assessing the quality of dry mummy extract and raw materials [5, 7–9, 22–28], carried out at the FNECC TMDL of Roszdrav for the period 1995–1999, it became possible to obtain reliable results of studying the specific pharmacological activity of mummy ...

In particular, its hepatoprotective (at doses of 100 and 250 mg / kg) and choleretic (at doses of 100 and 500 mg / kg) [5, 22, 23, 25-28] have been shown.

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