

Biological activity of the mummy. Publication 9: Effects on the respiratory system, smooth muscles, excretory function
kidneys, adrenal glands, blood vessels, periodontal and cornea conditions

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SUMMARY

The results of numerous experimental studies on the study of the effect of mummy on various systems of the organism of laboratory animals (respiratory, smooth muscles, renal excretory function, adrenal glands and blood vessels) and the possibility of using it in various diseases, including in dental and ophthalmological practice, are presented and analyzed.

Key words: mummy, cornea, periodontal disease.

Resume

The multiple experimental results have been produced and analyzed on the study of mummy effect on different systems of tested animal organisms (respiratory, unstriped muscles, excretory kidney function, adrenal glands and vessels). The possibility to use mummy for several diseases including in stomatological and ophthalmological practice has also been considered.

The spectrum of biological activity of mummy, described in numerous bibliographic sources, is very diverse. Previous publications were devoted to: antibacterial [14]; anti-inflammatory [15], anti-burn [15], regenerative [15] antiulcer [16], hepatoprotective [16], choleric [16], adaptogenic [21] action; regenerative action in bone fractures [17]; influence: on the gastrointestinal tract [16]; reparative regeneration in traumatic nerve injuries [18]; the course of experimental acute radiation sickness [19]; course and outcome of acute myocardial infarction [20]; the immune system [21].

This publication contains the results of experimental studies carried out on various laboratory animals to study the effect of the organo-mineral complex of mummy on the body systems and the possibility of using it in various diseases.

I. Results of studying the effect of mummy on the respiratory system

Since the ancient and Middle Ages in the East, the mummy was considered a very effective remedy for curing coughs. For this purpose, a mixture consisting of one tassuj (0.18 g) of mummy in jujuba juice with barley water and cordia was used on an empty stomach for three days [1].

Until now, doctors in India widely use shilajit for acute and chronic bronchitis, especially in pediatric practice and gerontology, bronchiectasis (expansion of limited areas of the bronchi); asthma in patients with liver disease and indigestion; asthma in people with gout; with tuberculosis of the lungs and intestines; tuberculosis in diabetic patients; with false croup, even in the absence of spasms [26].

KM Nadkarni in "Indian materia medica" notes the stimulating activity of shilajit on respiration [26]. An informational and analytical study of bibliographic data from the second half of the 20th century indicates the interest of modern specialists in studying the effect of various doses and methods of administration of mummy on the respiratory system.

ON. Shelkovsky (1965) studied the response of the respiratory system (lung tissue) to intravascular administration of various doses mummy extract. The latter was obtained from raw materials from the Penjikent region (western Tajikistan, the left bank of the Zarafshan River). The purification of raw materials was carried out in the laboratory of the chemistry of natural compounds of the Institute of Chemistry of the Academy of Sciences of the Tajik SSR [23].

The studies were carried out on adult dogs weighing 10 to 25 kg under light morphine ether anesthesia. The mummy extract was introduced in the form of a 40-20-10-5-1% solution (with the corresponding specific gravity of solutions 1,200-1,100-1,060-1,045-1,010) at the rate of 1 ml per 1 kg of animal weight [23]. In the course of the study, it was shown that intravenous administration of mummy extract causes a parasympathetic, and intra-arterial - a sympathetic response from the vascular system [23].

A similar reaction was noted when analyzing the quantitative change in the respiratory rhythm. With intravenous administration of the drug, the most pronounced was the contraction of the alveoli and the plethora of the vessels of the pulmonary circulation [23].

The effect of mummy thick extract on respiration was studied by K.Kh. Khaidarov et al. (1965) in acute experiments on dogs. The extract was obtained from raw materials collected at two points of the Zeravshan ridge near the village of Gozzon in the area of Lake Iskander-Kul. The animals, which were under urethane anesthesia, were injected intravenously with the drug in the form of 5-10% solutions [22]. The results of the study showed that thick mummy extract did not have a pronounced effect on respiration. So, when it was introduced in doses of 10-20 mg / kg, there were no changes in respiration. With an increase in the dose to 50-100 mg / kg, a slight, lasting 3-5 minutes, excitement was observed [22].

Yu.N. Nuraliev (1973, 1977) found that at the time of intravenous administration of the mummy there is a short-term (on 10-40 seconds) slowing down of the breathing rhythm, after which it increases with a noticeable deepening [7, 8].

The ability of Shilajit to enhance the secretion of the mucous membranes of the respiratory tract after short-term administration (within 10 days) of subtoxic doses (50 mg / kg of body weight) of Bostandyk Shilajit (Kazakhstan) was revealed by E.T. Shishkova (1971) in experiments on rats and mice [25].

II. Results of studying the effect of mummy on smooth muscles

K.Kh. Khaidarov et al. (1965) studied the effect of a thick purified extract of mummy on the smooth muscles of an isolated (according to Magnus) rabbit intestines in dilutions of 10-7-10-6-10-5-10-4-10-3. No significant changes in the amplitude of contractions of the isolated intestine and its tone were found under experimental conditions [11]. During the study, it was also shown that in all dilutions the studied extract of thick mummy did not relieve the spasm of the isolated rat intestine caused by acetylcholine at a concentration of 10-6 [22].

III. Results of studying the effect of mummy on renal excretory function

The first mentions of the effect of mummy on the excretory function of the kidneys are found in the medical treatise "Canon of Medicine" Abu Ali ibn Sina (980-1037) [1] and in the more modern work of the doctor KM Nadkarni «Indian materia medica» [26].

Studies by most modern authors also confirm the presence of diuretic activity in mummy preparations. A.I. Leskov et al. (1965) it was found that oral administration of filtered solutions of mumiyo in doses 125 and 250 mg / kg causes an increase in daily urine output in rats, respectively, by 27% and 23% [5].

As a result of the experiment carried out by Yu.N. Nuraliev (1970) on white rats, it was found that Eight control rats after water load during the first hour excreted on average $36 \pm 2\%$, and after 4 hours - $71 \pm 8\%$ of the injected volume of water [7, 8]. Shilajit at a dose of 50-600 mg / kg markedly increased the release of water during the first hour of the experiment from 58 ± 5 to $69 \pm 5\%$. The total amount of water released in 4 hours was much higher in the experimental group ($87.1 \pm 8-92 \pm 6\%$) than in the control group [7, 8].

Under the influence of mummy, there was also a decrease in the content of sodium and chloride in the blood serum of experimental animals, which was explained by the diuretic effect of mummy and its ability to reduce the fluid content in tissues [7, 8]. Thus, shilajit has a noticeable diuretic effect at doses of 150 mg / kg and higher. The severity of diuretic activity is directly

proportional to the dose of the drug; the larger the dose, the more pronounced the diuretic effect. The presence of a diuretic effect is associated with the content of hippuric acid and urea in the mummy, which have a diuretic effect [7]. The described research results are consistent with our own data on the presence of a pronounced choleric activity of dry mummy extract [10-13].

IV. Results of studying the effect of mummy on the adrenal glands

Any impact on the body that requires urgent mobilization of its defenses is accompanied by an increase in the function of the adrenal cortex.

Studies of V.A. Savenko et al. (1965). The object of the study was mummy preparation obtained from raw materials at the Institute of Chemistry of the Academy of Sciences of the Tajik SSR. The effect of intravascular administration of mummy on the content of 17-hydroxycorticosteroids in the peripheral blood was studied [9]. The studies were carried out on sexually mature male dogs, divided into two series (5 dogs per series). VI series was determined by the content 17-hydroxycorticosteroids in the blood of dogs with intra-arterial administration of a 1% solution (in physiological solution) mummy at the rate of 1 ml / kg of animal weight. In II series was determined by the content 17-hydroxycorticosteroids in the blood of dogs with intravenous administration of the same amount of mummy. The content of 17-hydroxycorticosteroids was determined over time 5, 30, 60 and 90 minutes after the drug was administered. The state of function of the adrenal medulla was judged by the content of adrenaline-like compounds in the blood of dogs after intravenous administration of a 1% solution of mummy [9].

The results of the study showed that the content of 17-hydroxycorticosteroids in the plasma of dogs was normally 1.5–3.8 µg per 100 ml. Intra-arterial administration of mummy caused an increase in the level of 17-hydroxycorticosteroids up to 40.3 µg per 100 ml (224%) 1 hour after the administration of mummy and up to 48.1 µg per 100 ml (268%) after an hour and a half. With intravenous administration of mummy, a similar change in the content of 17-hydroxycorticosteroids in the blood occurred, but the increase in their level was significantly lower than with intra-arterial administration. So, an hour after administration, an increase in the content of 17-hydroxycorticosteroids was observed to 27.6 µg per 100 ml (182%) and after an hour and a half - up to 31.4 µg per 100 ml (208%) [9].

In the study of adrenaline-like compounds, a slight decrease in their concentration in the blood was found immediately after the administration of mummy. Subsequently, their content was restored to the initial level [9]. The results of the conducted studies allowed the authors to conclude that when administered intravascularly, mummy is a stressor substance. Since the secretion of corticosteroids remains high during the action of mummy, the authors suggest that animals cannot adapt to this stressor [9].

There are instructions from other authors about the ability of the Caucasian mummy to stimulate the activity of the adrenal glands - V.V. Karpova (1970) [4] and A.L. Shinkarenko (1972) [24].

V. Results of studying the local effect of mummy on blood vessels

Yu.N. Nuraliev (1977) performed experiments with the perfusion of the vessels of the isolated rabbit ear. During the research it was shown that mummy in dilutions of 1: 20,000–1: 40,000 does not change the vascular tone of an isolated rabbit ear. When the vessels were perfused with more concentrated solutions of mummy (1: 1000–1: 10000), statistically insignificant expansion was noted [7, 8].

Vi. Results of studying the allergic properties of mummy

Research carried out by A.I. Leskov et al. (1965) indicate that mummy in concentrations 1:10 and 1: 2 after subcutaneous administration to rabbits does not cause changes at the injection site [5].

At the Department of Pathological Physiology SAMPI N.M. Madzhidov et al. (1980) allergic properties were studied Central Asian mummy-asil. During the experiment, which lasted 2 weeks, it was found that there were no cases of allergic reactions and anaphylactic shock when the drug was administered to guinea pigs intradermally, subcutaneously, intramuscularly and intraperitoneally [6].

Vii. Results of studying the effect of mummy on the state of the periodontium

At the Department of Prosthetic Dentistry and in the viral-bacteriological group of the Central Scientific Research Institute of the Tashkent State Medical Institute A.Kh. Khabilov (1971), for the first time, clinical, laboratory, bacteriological and experimental studies were carried out efficacy of mumiyo-asil extract in dental practice and, in particular, in the treatment of periodontal disease.

The study included three groups of animals. Group I consisted of 90 guinea pigs and 10 dogs; II - 45 guinea pigs and 6 dogs; III - 15 guinea pigs and 2 dogs. The drug was administered to animals orally through a tube in the form of a 10% emulsion daily for two months. Guinea pigs received mummy-asil extract at a dose of 0.1 g / kg, dogs - 0.2 g.

In the course of the study, it was found that in case of periodontal inflammation, mummy extract helps to reduce tooth mobility and inflammation, eliminate pathological periodontal pockets, reduce the amount of dental plaque and, ultimately, help strengthen teeth. The phenomena of intoxication were absent when taking even large doses of the drug.

VIII. Results of studying the effect of mummy on the state of the cornea of the eye

A.I. Leskov et al. (1965) it was found that there is no irritating effect of mummy in concentrations 1:10 and 1: 2 on the conjunctiva and cornea of the eye of rabbits, as well as any negative changes at the injection site [5].

E.S. Kanevskoy et al. (1977) was investigated 3.5% solution of mummy for penetrating wounds of the cornea of rabbits. During the experiment, it was shown that under the influence of mummy, inflammatory phenomena in the cornea of the experimental group of animals were less pronounced than in the control, which received a solution of albucid. On the 30th day of the experiment, the animals of the experimental group developed a more extensive scar with complete epithelialization [3].

IX. The discussion of the results

The results of the conducted information and analytical research were summarized by us in table. 1.

Table 1

The effect of mummy on the respiratory system, smooth muscles, renal excretory function, adrenal glands, blood vessels, condition periodontal and cornea

№ п/п	Автор исследования, библиографическая ссылка	Год	Характеристика объекта исследования				Результаты исследований
			Название препарата и его концентрации	Способ введения и дозы	Опытные животные	Место отбора проб мумий	
1.	Н.А. Шелюзовский [12]	1965	экстракт мумий (1,5, 10, 20, 40 % растворы)	внутривенное и интратриггеральное в количестве 1мл/кг	собаки	Пенджаб	Внутривенное введение сопровождается парасимпатической, интратриггеральное – симпатической реакцией со стороны сосудистой системы.
2.	К.Х. Хайдаров с соавт. [11]	1965	экстракт мумий сухой	внутривенно 10 % раствор	собаки	Зеравшанский хребт	Не оказывает выраженного влияния на дыхание. В дозе 10–20 мг/кг не наблюдается изменений со стороны дыхания. В дозе 50–100 мг/кг наблюдается возмущительное возбуждение.
			экстракт мумий густой		кролики		Не вызывает изменения амплитуды сокращений изолированного мышечника. В разведениях 1:20000–1:40000 не изменяет тонус сосудов изолированного уха. В разведениях 1:1000–1:10000 расширяет сосуды изолированного уха.
			экстракт мумий густой		крысы		Не снижает спазма изолированного мышечника.
3.	Ю.Н. Нуралиев [7,8]	1973–1977	мумий	внутривенно	крысы	Средняя Азия	Вызывает кратковременное замедление ритма дыхания, с дальнейшим учащением и углублением. Оказывает выраженное диуретическое действие в дозах 150 мг/кг и выше. Степень выраженности диуретической активности прямо пропорциональна дозе препарата.
			мумий	внутривенно	крысы	Средняя Азия	В момент введения вызывает замедление ритма дыхания, с дальнейшим учащением и углублением.
			мумий	перорально 50–600 мг/кг	крысы		Оказывает диуретическое действие. Степень диуретической активности прямо пропорциональна дозе препарата.
4.	А.И. Лесков с соавт.[5]	1965	мумий	внутривенно 125 и 250 мг/кг	крысы	не указано	Увеличивает суточный диурез на 27 % (при дозе 125 мг/кг) и 23 % (при дозе 250 мг/кг).
				1:10, 1:20	кролики	не указано	Не оказывает раздражающего действия на конъюнктиву и роговицу глаза; не вызывает раздражения на месте введения.
5.	В.А. Савенко [9]	1965	препарат мумий, 1%-ный раствор	интратриггеральное и внутривенное; 1 мл/кг	собаки	Таджикстан	Внутритриггеральное и внутривенное введение вызывают повышение уровня 17-оксикортикостероидов. Внутривенное введение также повышает содержание 17-оксикортикостероидов, но несколько ниже, по сравнению с интратриггеральным.
6.	Е.Т. Шиянова [14]	1971	мумий	50 мг/кг	крысы, мыши	Бостандыкское месторождение	Усиливает секрецию дыхательных путей.
7.	А.Х. Хабитов	1971	экстракт мумий-асиль – 10%-ная эмульсия	перорально 0,1 г/кг – морским свинкам; 0,2 г – собакам	морские свинки, собаки	Средняя Азия	Способствует уменьшению подвижности зубов, уменьшению воспалительных явлений, ликвидации зубодесневых карманов, снижению количества зубных отложений, укреплению зубов.
8.	Н.М. Мадридидов [6]	1980	мумий-асиль	внутрикожно, подкожно, внутримышечно, интратриггерально	морские свинки	Средняя Азия	Не вызывает аллергических реакций и анафилактического шока.
9.	Е.С. Каневская [3]	1977	мумий 3,5 %-ный раствор		кролики		Уменьшает воспалительные явления в роговой оболочке глаза.

From the data in the table, it can be seen that dry mummy extract does not have a pronounced effect on respiration, the amplitude of contractions of the isolated intestine and the vascular tone of the isolated ear of animals.

In the course of experimental studies, the diuretic activity of the drug was revealed, manifested at a dose of 150 mg / kg and above. Moreover, the severity of diuretic activity is in direct proportion to the dose of the drug; the larger the dose, the more pronounced the diuretic effect.

The ability of mummy, with intra-arterial and intravenous administration, to cause an increase in the level of 17-oxy corticosteroids in the blood, has been established.

There were no cases of allergic reactions and anaphylactic shock when the drug was administered to laboratory animals intradermally, subcutaneously, intramuscularly and intraperitoneally.

In case of periodontal inflammation, mummy extract helps to: reduce tooth mobility and inflammation, eliminate pathological periodontal pockets and, ultimately, strengthen teeth. Under the influence of mummy, inflammation in the cornea of the eye decreases, and its epithelization occurs faster. Thus, according to the results of experimental studies, mummy can be considered a promising drug with a wide spectrum of biological activity.

However, in order to introduce mummy preparations into clinical practice, it is necessary to conduct experimental and clinical studies on standardized samples of dry mummy extract for all of the listed indications. In this case, special attention should be paid to the scientifically grounded selection of the dosage of dry mummy extract in each specific case.

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