

ETIOPATHOGENESIS AND TREATMENT OF MELANOMA IN WHITE AND BLUE HORSES

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Annotasiya

The research was conducted mainly on Karabayir horses, and the results showed that because melanomas are so common in mostly white and gray horses, many people think of them as benign, random skin tumors. Although many consider these tumors to be safe, they can be malignant and their location can affect the horse's health.

More than 80% of melanoma lesions accumulate at one point to form nodular tumors, in some this process occurs quickly, while in others it can take a long time to become malignant. These processes are caused by various external and internal factors. For example, it was found that in a blue horse with melanoma, the tumors grew rapidly during sports, and the tumors grew slowly when exercise was restricted.

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Enter. In recent years, horses have been widely used in our republic not only as a means of transport, but also in various sports and in the cultivation of goats and sheep. That is why it is important to increase the number of horses and raise them healthy. However, various infectious, invasive, sterile diseases, mechanical injuries, and especially tumor diseases are common among horses, which lead to their development, productivity, and reduced work ability.

Melanoma is a very common nodular skin disease, mostly in white and gray horses (usually over 7-8 years of age), and more than 80-85% of white and gray horses will develop at least one melanoma in their lifetime.

Melanocytic tumors in horses are of concern to horse owners and veterinarians, because their presence causes health and economic damage to horses, and in some cases, horses are abandoned due to the disease [1]. Many authors state that every gray horse can develop a melanocytic tumor if there is an age-related predisposition [2].

Approximately 80% of equine tumors are skin tumors, of which 15% are melanocytic tumors. More than 90% of equine melanocytic tumors are benign; however, approximately 66% have the potential to metastasize and tend to become malignant [1,3,4,14]. Although horses of all colors have been diagnosed with melanocytic tumors, white and gray horses appear to be particularly susceptible,

occurring in 80% of horses over 15 years of age [5,6]. Non-gray horses, such as thoroughbreds and geldings, may also have melanocytic tumors that are more likely to be malignant and metastasize early; This is probably because they experienced higher melanocyte activity compared to gray horses [5].

The heritability of melanocytic tumors in gray horses is moderate is shown to be [7]. A study of 295 gray Lipizzaner horses reported a heritability estimate of 0.36 with a standard error of 0.11, suggesting an effect of additional melanoma on disease progression [8]. Although some breeds, such as Arabians and Lipizzaner horses and Andalusian horses, appear to be genetically predisposed, it is not clear whether this predisposition is breed-specific or is influenced by the prevalence of gray in these breeds [1,8].

Horses can develop melanoma at any age – some may even be present at birth!

Classification of melanoma: The nomenclature and classification of melanocytic tumors are also complex for clinicians and pathologists. In general, these tumors can be classified as dangerous or benign. Benign tumors, also called melanocytomas, can be congenital or acquired and can invade and metastasize to surrounding tissues. Malignant, also called melanoma, describes a less differentiated cell that infiltrates the surrounding tissue, shows vascular or lymphatic invasion and recurrence after surgery, and tends to metastasize. Because most melanocytic tumors have been shown to be malignant, the general term melanoma is often used to classify malignant or benign tumors, while equine malignant melanoma is used to classify truly malignant forms of the disease [2,4,9,10,11,14].



Figure 1. Melanoma

In the classification of melanoma, four categories are proposed, three of which have a potentially dangerous behavior: naevus; skin melanoma; dermal melanomatosis and anaplastic malignant melanoma [3,12]. Currently, four rare types of equine nevus have been described that show similarities to human nevus subtypes: melanocytic nevus, intradermal common melanocytic nevus, cellular blue nevus, and combined cellular blue nevus [12].

nevus (spot): is not limited to gray horses and usually appears in young (up to 5-6 years) in atypical anatomical areas such as the neck, limbs, trunk and face. A melanocytic nevus is a benign form of pigmented lesion that occurs in horses 6 years of age or younger, may be congenital, and usually has epidermal involvement. The remaining types of naevus affect the skin and can appear between the ages

of 2 and 20 [3]. Because of limited epidermal or superficial skin involvement and clinically and histologically benign tumors, only melanocytic ducts are truly benign types or melanocytomas [1,2,5].

Dermal melanomas are circumscribed and discrete lesions; they are common in white and gray horses from young to old, and there are several spherical isolated masses. They can be dangerous or safe [1].

Dermal melanomatosis: usually includes older horses, characterized by the presence of multiple and often confluent masses. The previous two are the most common types of melanocytic tumors diagnosed in horses. Many authors classify them as different stages of the same type, because there is a clinical continuum between the two types. Histologically, they are very similar, but have different clinical manifestations [2,13].

Anaplastic malignant melanoma: is a rare category, more common in older and non-grey horses. It is very aggressive and can be fatal within a few months. It grows quickly and often has a gray or pinkish-gray pattern on the surface of the mass [13].

Dermal melanoma, dermal melanomatosis and anaplastic malignant melanoma are located in deep areas of the skin and are characterized by a tendency to malignant behavior, as some of them show infiltration of the surrounding tissues and widespread spread to other areas and organs. In particular, there are some reports of spinal cord compression following infiltration of the spine and paravertebral muscles by perineal and basolateral tumor masses (Rodriguez et al., 1998). Due to its propensity to be a malignant tumor, the concept of malignant melanoma of the horse is widely used to describe this type of tumor [4,11,12]. Moore et al., 2013 proposed four different clinical stages to classify EMM. Table 1.

Table 1 Clinical stages of equine malignant melanoma.

Stage	The number of masses	Diameter	Growth pattern	Distribution
1	The only one	<2 cm	Slow (the same size over months and years)	No
2	A few	<2 cm	Slow (the same size over months and years)	No
3	A few	<4 cm	Slow (25% growth in volume over months or years)	Current
4	A few	>4 cm	Fast (25% growth in weeks or months)	Current

The obtained results and their analysis. The research was conducted mainly on Karabayir horses, and the results showed that because melanomas are so common in mostly white and gray horses, many people think of them as benign, random skin tumors. Although many consider these tumors to be safe, they can be malignant and their location can affect the horse's health.

More than 80% of melanoma lesions accumulate at one point to form nodular tumors, in some this process occurs quickly, while in others it can take a long time to become malignant. These processes are caused by various external and internal factors. For example, it was found that in a blue horse with melanoma, the tumors grew rapidly during sports, and the tumors grew slowly when exercise was restricted.

Melanocytic tumors are considered very dangerous when they appear in horses of other colors. They are usually a single, isolated lesion. They are more likely to be present in large numbers and have large areas of settlement in red, black and fawn colored horses.



Figure 2. Bilateral rectal tumor.

The size of the tumor does not indicate its danger. Small melanomas can be very dangerous and large ones are benign or vice versa.

In some horses, melanoma is so dangerous that it can spread to the internal organs, which has a very poor prognosis for the affected horse.

In addition, more advanced and widespread forms of the disease (dermal melanomas and dermal melanomatoses) are not so easy to manage. However, in small dermal melanomas or in cases of physiological dysfunction due to tumor growth, such as rectal or perianal obstruction, only surgery can be used (Figure 1).

To improve the physiological condition of the horse, the tumor can be removed in whole or in part, although the procedure is difficult and reconstructive surgery may be required. In some cases, when there is widespread swelling of the tail, a complete amputation of the tail is possible. However, when faced with anaplastic malignant melanoma, even with this aggressive intervention, the outcome is poor. In non-gray horses, the widest possible margins should be obtained, every neoplastic cell should be removed, and the site should be thermally cauterized, as the tumors are more likely to be malignant and behave aggressively than in gray and white horses. . In addition, in such cases, a histological examination should always be carried out and 10 ml of methotrexate should be injected intramuscularly for 5 days. Partial excision may promote tumor regrowth and metastatic spread, suggesting the importance of surgical intervention when total excision is achievable.



Figure 3. Melanoma tumor from a gray horse.

In experiments, it was found that the predisposition of melanoma horse breeds will not be completely correct. In this regard, 120 "Karabayir" horses were examined. Melanoma has been found in 50-60% of mostly white and gray horses.

Conclusions.

Although melanocytic tumors are of great importance when it comes to horse skin tumors, more research is still needed due to the lack of knowledge that is still available, mainly compared to other types of tumors.

- melanocytictumors are considered very dangerous when they appear in horses of other colors. They are usually a single, isolated lesion.
- the prevalence of melanomas in gray horses in some horse breeds increases the need to find effective and easily accessible prevention and treatment methods.
- to improve the physiological condition of the horse, the tumor can be removed in whole or in part, although the procedure is difficult and reconstructive surgery is required.
- Research aimed at understanding the pathophysiology and biological differences between equine melanocytic tumors will help to find more accurate diagnostic and prognostic biomarkers that will help pathologists and clinicians to develop new therapeutic methods.
- vital organs spinal cord, eye, heart or brain tumors can be fatal, while others can cause clinical disease (colic or cardiac arrhythmias) and reduced athletic ability.

- in horses infected with melanoma, a histological examination should always be carried out and 10 ml of methotrexate should be injected intramuscularly for 5 days. Partial excision may promote tumor regrowth and metastatic spread, suggesting the importance of surgical intervention when total excision is achievable.

References.

1. Smith SH, Goldschmidt MH, Mcmanus PM A comparative review of melanocytic neoplasms. *vet. Pathol.* 2002; 39 :651–678. doi: 10.1354/vp.39-6-651.
2. Knottenbelt DC, Patterson-Kane JC, Snalune KL *Clinical Equine Oncology*. Elsevier; Amsterdam, The Netherlands: 2015. Melanocytic neoplasms; pp. 237–246.
3. Valentine BA Equine melanocytic tumors: a retrospective study of 53 horses (1988 to 1991) *J. Vet. Intern. Med.* 1995; 95 :291–297. doi: 10.1111/j.1939-1676.1995.tb01087.x.
4. Rodríguez F., Forga J., Herráez P., Andrada M., Fernández A. Metastatic melanoma causing spinal cord compression in a horse. *vet. Recommendation.* 1998; 142 :248–249. doi: 10.1136/vr.142.10.248.
5. Johnson P. Dermatologic tumors. *vet. Clean. N. Am. Horse breeding practice.* 1998; 14 :625–659. doi: 10.1016/S0749-0739(17)30190-6.
6. Phillips JC, Lembcke LM Equine Melanocytic Tumors. *vet. Clean. N. Am. Horse breeding practice.* 2013; 29 :673–687. doi: 7.1016/j.cveq.2013.08.008.
7. Curik I., Druml T., Seltenhammer M., Sundström E., Pielberg GR, Andersson L., Sölkner J. Complex inheritance of melanoma and coat and skin pigmentation in gray horses. *PLoS Genet.* 2013; 9:e1003248. doi: 1371/journal.pgen.1003248.
8. Seltenhammer MH, Simhofer H., Scherzer S., Zechner P., Curik I., Sölkner J., Brandt SM, Jansen B., Pehamberger H., Eisenmenger E. Equine Melanoma in a population of 296 Gray Lipizzaner horses. *Horse veterinarian. J.* 2003; 35 :153–157. doi: 10.2746/042516403776114234.
9. Moore JS, Shaw C., Shaw E., Buechner-Maxwell W., Scarratt WK, Crisman M., Furr M., Robertson J. Melanoma in horses: Current perspectives. *Horse veterinarian. Education.* 2013; 25 :144–151. doi: 10.1111/j.2042-3292.2011.00368.x.
10. Macgillivray KC, Sweeney RW, del Piero F. Metastatic melanoma in horses. *J. Vet. Intern. Med.* 2002; 16 :452–456. doi: 10.1111/j.1939-1676.2002.tb01264.x.
11. Patterson-Kane JC, Sanchez LC, Uhl EW, Edens LM Disseminated metastatic intramedullary melanoma in an elderly gray horse. *J. Comp. Pathol.* 2001; 125 :204–207. doi: 10.1053/jcpa.2001.0481.
12. Cavalleri JMV, Mählmann K., Steinig P., Feige K. Etiology, clinical presentation and current treatment options of equine malignant melanoma - a review of the literature. *Pferdeheilkunde.* 2014; 30 :455–460. doi: 21836/PEM20140410.
13. Sullins K.E melanocytic tumors in horses. *Horse veterinarian. Education.* 2020; 32 :624–630. doi: 10.1111/eve.13159.
14. Karimov, M. G. INJURY AND PREVENTION OF DISTAL PART ORGANS IN" KORABAYR" BREED HORSES Karimov MG Choriev ON.
15. Norboyevich, C. O. (2023). MORPHOMETRIC CHARACTERISTICS OF THE SKIN OF YOUNG HORSES. *Ethiopian International Journal of Multidisciplinary Research*, 10(12), 303-310.

16. Dilmurodov, N., Doniyorov, S., & Choriev, O. (2022). ИЗМЕНЕНИЕ КОЛИЧЕСТВА ЗОЛЫ И ОБЩИХ ОРГАНИЧЕСКИХ ВЕЩЕСТВ В СОСТАВЕ ПЛЕЧЕВОЙ КОСТИ ЦЫПЛЯТ-БРОЙЛЕРОВ В ПОСТНАТАЛЬНОМ ОНТОГЕНЕЗЕ. *Вестник ветеринарии и животноводства (ssuv. uz)*, 2(1).
17. Zafarovich, D. S., Babakulovich, D. N., & Norboyevich, C. O. (2022). Changes in the Amount of Calcium and Phosphorus in the Composition of the Femur Bone of Broiler Chickens in Postnatal Ontogenesis. *International Journal of Innovative Analyses and Emerging Technology*, 2(2), 21-25.