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Case Reports

Management of Digit Papillomas in Golden Retriever Dogs

Manajemen Papiloma pada Jari Anjing Golden Retriever

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ABSTRACT

Background: Papillomas are benign tumors that affect the skin or soft tissue beneath the skin. These papillomas can be accompanied by various abnormalities such as pustules, itching, hematomas, cysts, blisters, abscesses, lick granulomas, and skintags. While papillomas may resolve on their own, some cases require intensive treatment and management. **Purpose:** To provide veterinarians with insights into diagnosing and managing papilloma cases. **Case:** A 10-year-old male Golden Retriever presented with an open wound on the left front paw nail. The wound originated from a broken nail, which led to a non-healing wound over a period of 2 months. Clinical examination revealed a mass-like lesion that had ruptured. Palpation of the left front paw nail area indicated an irregular, lobular growth resembling grapes or cauliflower. **Case Management:** Routine hematology revealed that the dog had microcytic hypochromic anemia, while blood chemistry indicated mildly reduced kidney function. Cytology confirmed that the wound was a papilloma. Treatment involved digit amputation to completely remove the tumor mass, along with wound care that included the application of ointments, antibiotics, analgesics, hematopoietic agents, anti-bleeding medication, and anti-cancer drugs. Supportive treatment included multivitamins, nerve supplements, immune supplements, and skin and coat supplements (Coatex). By the fifth postoperative day, the wound had dried, and the edges were healing well. **Conclusion:** Papillomas are benign and not harmful, but it is recommended to completely remove the tumor mass to prevent secondary infections.

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ABSTRAK

Latar Belakang: Papiloma adalah tumor jinak yang memengaruhi kulit atau jaringan lunak di bawah kulit. Papiloma ini dapat disertai dengan berbagai kelainan seperti pustula, gatal, hematoma, kista, lepuh, abses, granuloma jilat, dan skintag. Meskipun papiloma dapat sembuh dengan sendirinya, beberapa kasus memerlukan perawatan dan penanganan intensif. **Tujuan:** Memberikan wawasan kepada dokter hewan tentang diagnosis dan penanganan kasus papiloma. **Kasus:** Seekor Golden Retriever jantan berusia 10 tahun datang dengan luka terbuka di kuku kaki depan kiri. Luka tersebut berasal dari kuku yang patah, yang menyebabkan luka yang tidak kunjung sembuh selama 2 bulan. Pemeriksaan klinis menunjukkan lesi seperti massa yang telah pecah. Palpasi area kuku kaki depan kiri menunjukkan pertumbuhan lobular yang tidak teratur menyerupai buah anggur atau kembang kol. **Penatalaksanaan Kasus:** Hematologi rutin menunjukkan bahwa anjing tersebut mengalami anemia hipokromik mikrositer, sementara kimia darah menunjukkan fungsi ginjal yang sedikit menurun. Sitologi mengonfirmasi bahwa luka tersebut adalah papiloma. Perawatan melibatkan amputasi jari untuk mengangkat massa tumor secara menyeluruh, bersama dengan perawatan luka yang mencakup pemberian salep, antibiotik, analgesik, agen hematopoietik, obat antiperdarahan, dan obat antikanker. Perawatan suportif mencakup multivitamin, suplemen saraf, suplemen imun, dan suplemen kulit dan bulu (Coatex). Pada hari kelima pascaoperasi, luka telah mengering, dan tepinya sembuh dengan baik. **Kesimpulan:** Papiloma jinak dan tidak berbahaya, tetapi dianjurkan untuk mengangkat massa tumor secara menyeluruh untuk mencegah infeksi sekunder.

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Kata kunci: Anjing; Jari; Kulit; Papiloma Anjing; Tumor Jinak

INTRODUCTION

Routine health checks for pets are an important aspect that owners must pay attention to in order to ensure their pets remain in good health. Dogs are highly susceptible to various infectious diseases, such as rabies, leptospirosis, canine distemper, and parvovirus, as well as degenerative diseases and growth disorders, such as skin tumors. The incidence of skin tumors in dogs is relatively high, ranging from 9.5% to 51% of all tumor cases (Bronden, *et al.,* 2010). Papilloma, or skin tumors, are abnormal proliferations that affect the skin or soft tissues beneath the skin and can be benign. These papillomas can appear on the skin of both male and female dogs. Generally, the causes are divided into two categories: intrinsic factors, such as breed, cell rest, age, sex, and pigmentation; and extrinsic factors, such as carcinogens, radiation, mechanical trauma, and viral infections (Smiech, *et al.,* 2023). Papillomas are often accompanied by other abnormalities such as pustules, itching, hematomas, cysts, blisters, abscesses, lick granulomas, and skin tags (Medeiros-Fonseca, *et al.,* 2023).

Papillomas generally have a good prognosis with appropriate treatment. Many papillomas, particularly those occurring in young dogs or humans, can resolve on their own without medical intervention (Iyori, *et al.,* 2019). However, in some cases, especially if papillomas progress or do not respond to treatment, more intensive medical management may be required. Since information on diagnosing and managing papillomas is still limited, this article provides insights into the management of papillomas in dogs.

CASE

Anamnesis and Signalment

A 10-year-old male Golden Retriever presented with an open wound on the left front paw (Figure 1). The wound began after a nail fracture and had not healed for the past two months. The dog is active, responsive, and has a good appetite and hydration. When walking, the dog slightly limps and lifts the left front paw, which has an open wound. Physical examination reveals a weight of 26.5 kg, a rectal temperature of 39.2°C, skin turgor of less than two seconds, and crusty skin on the digits with a wound and papilloma present. On the left front paw, there is a ruptured mass. Palpation reveals an irregular (lobular) growth, similar to grapes or cauliflower, with a solid consistency, approximately 10 cm in diameter, and alopecia on the mass. Additional diagnostic tests, including routine hematology, blood chemistry, and cytology preoperation, are performed to support the diagnosis.

Table 1. The Results of The Routine Hematology Examination

Hematology	Result	Reference*:	Unit	Explanation
Hemoglobin	11,8	12,0-18,0	g/dL	Low
Erythrocytes	6,3	5,5-8,5	x 10^6/µL	Normal
Hematocrit	37,2	37,0-55,0	%	Normal
MCV	59,2	60,0-77,0	Fl	Low
MCH	18,7	19,5-26,0	Pg	Low
MCHC	31,7	30,0-38,0	%	Normal
Leukocytes	8.300	6.000-17.000	µL	Normal
Neutrophils	79	60-77	%	High
Eosinophils	0	2-10	%	Low
Basophils	0	0-1	%	Normal
Lymphocytes	18	12-30	%	Normal
Monocytes	5	3-10	%	Normal
Platelets	1,9	2-5	x 10^5/µL	Low

Note: * Source: Schalm (2010).

Table 2. The Results of The Blood Chemistry Tests.

Blood Chemistry	Result	Unit	Reference*	Explanation
Liver Function Tests				
AST/SGOT	33.2	U/L	5-55*	Normal
ALT/SGPT	9.22	U/L	5-60*	Normal
Kidney Function Tests				
BUN	30.2	mg/dL	7-27*	High
Creatinine	1.9	mg/dL	0.4-1.8*	High

Note: * Source: Schalm (2010).

Laboratory Examination

An impression smear examination cytologically evaluated the condition of the skin before treatment was administered (preoperation). Samples were taken by placing a sterile object lens on the skin and drying it. Subsequently, the samples were stained with Giemsa cytological stain and examined under a microscope. Routine hematology results, as shown in Table 1, revealed that the dog had microcytic hypochromic anemia. This is indicated by a decreased mean corpuscular volume (MCV), which reflects a reduction in the average size and volume of red blood cells, along with a vitamin B12 deficiency. Elevated neutrophil levels suggested an infection, reflecting the body's physiological response to infection or inflammation, similar to the increase in leukocytes. Erythrocyte, leukocyte, hemoglobin, and platelet levels were all within normal ranges.

Blood Chemistry

The blood chemistry analysis revealed increased levels of blood urea nitrogen (BUN) and creatinine. Increased levels of blood urea nitrogen (BUN) and creatinine indicate impaired

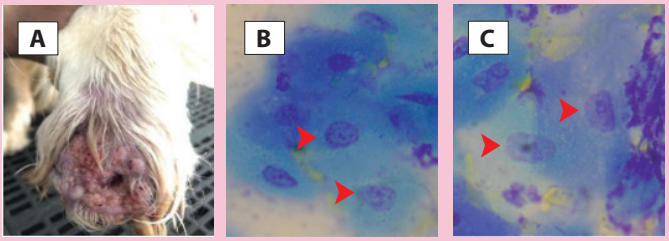

Figure 1. A. The image shows a dog's front paw with a fleshy, abnormal proliferations, possibly a papilloma, with slight surrounding inflammation and the mass that has ruptured. **B&C.** The diagnosis based on skin cytology examination is determined by the presence of squamous cells accompanied by vacuolation, also known as Koilocytes (Red arrows), Giemsa staining, 100x magnification.

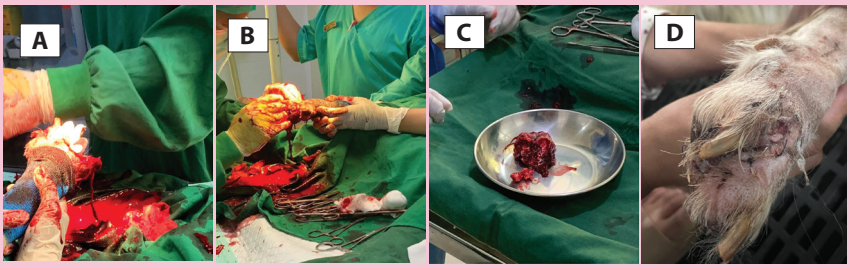

Figure 2. A&B. Tumor was prepared from the organ. **C.** Tumor mass that has been removed. **D.** Wound condition of the patient 3 days post-operation, the edges of a wound draw together, reducing its size.

kidney function or reduced glomerular filtration rate (GFR). This blood chemistry test is important to ensure there are no contraindications to the use of antibiotics and other treatments, so that therapy can be administered without affecting kidney and liver function, thereby optimizing recovery.

Diagnosis and Prognosis

Based on the history, physical examination, blood test, and cytology analysis, Givon was diagnosed with canine papilloma with a low level of infection. This diagnosis was supported by the presence of squamous cells with vacuolation, also known as koilocytic changes, as shown in Figure 1. In cases of papilloma, koilocytes are consistently present. Although they can sometimes be observed in chronic inflammatory conditions, their presence in a malignant pattern raises suspicion of a fully differentiated type of squamous cell carcinoma (SCC). Therefore, a histopathological examination is essential for confirmation. The prognosis was favorable, as the animal's overall condition was good, and recovery likely.

Treatment

The treatment involved digit amputation to ensure the complete removal of the tumor mass. The animal was fasted for 12 hours before surgery. Premedication was administered subcutaneously using 0.3% atropine sulfate (V-Tropin, Agrovet, Lima, Peru) at a dose of 0.03 mg/kg body weight. After 10 minutes, an intramuscular combination of 10% ketamine HCl (Keta-A-100®, Agrovet, Lima, Peru) at a dose of 11 mg/kg body weight and 1 cc of Medetin (Dong Bang Co. LTD, Korea) was administered to induce anesthesia. The tumor removal surgery was performed on the fourth digit (Figure 2). Once anesthesia was achieved, the animal was positioned in left lateral recumbency to expose the cranial proximal part of the left leg. The surgical site was cleansed and sterilized with 70% alcohol and povidone-iodine. The tumor was excised in an oval shape, extending 2 cm beyond its margins to ensure complete removal. The wound was retracted using Allis forceps to assess blood vessels, and careful dissection was performed to minimize trauma, with blood vessels ligated as necessary. Once the tumor was completely excised, the surgical site was irrigated with physiological saline (NaCl).

RESULT

Postoperative observations in a clinical case showed that the dog was active on the first day following surgery, benefiting from the rapid induction and short recovery time of ketamine anesthesia. By the second and third days post-surgery, the sutures exhibited mild redness, a normal response to the inflammatory phase of wound healing. This phase is characterized by swelling (tumor), pain (dolor), redness (rubor), heat (calor), and impaired function (functio laesa) (Wang *et al.*, 2022). Despite the persistent redness, the dog remain,ed in good health, maintaining a normal appetite and hydration levels. Proper nutrition and sufficient food intake play a crucial role in accelerating the healing process.

DISCUSSION

Papilloma lesions can be caused by CPV1, CPV2, or both simultaneously (Orlandi, *et al.*, 2021). In dogs, papillomas associated with CPV2 often manifest as endophytic papillomas (Reis and Batista, 2022). These lesions commonly develop on the face, ears, and legs, regardless of the dog's age, and are typically linked to canine papillomavirus (CPV) infection. They usually appear as small, flesh-colored lumps but can grow larger if left untreated. Several factors contribute to the development of papillomas, including a weakened immune system, viral exposure, and contact with infected dogs (Iyori, *et al.*, 2021). CPV2 infections are often associated with immune suppression and unfavorable environmental conditions. Persistent papillomas on the paws of dogs associated with CPV-2 have also been reported in some dogs with X-linked severe combined immunodeficiency, which can develop into invasive and metastatic squamous cell carcinoma (Goldschmidt, *et al.*, 2006).

Although skin papillomas are generally harmless, studies suggest a potential link between these lesions and microcytic hypochromic anemia, a condition characterized by smaller-than-normal red blood cells and low hemoglobin levels. Papilloma infections may cause discomfort and interfere with daily activities, potentially leading to a decreased appetite. Reduced food intake can result in iron deficiency, one of the primary causes of microcytic hypochromic anemia. Additionally, chronic infections or inflammation related to papillomas may disrupt iron metabolism and red blood cell production in the bone marrow.

Clinically, endophytic papillomas are characterized by gray, cup-shaped nodules ranging from 1 to 2 cm in diameter, with a central dome-shaped pore about 4 mm in size. Black papules measuring approximately 2 mm in diameter and papillary epidermal hyperplasia in the stratum corneum are also common (Reis and Batista, 2022). Notable koilocytic

changes are observed, though intranuclear eosinophilic or basophilic inclusions are rare (Boehm, *et al.*, 2021). Keratinocytes in the stratum granulosum display enlarged keratohyalin granules and an increased amount of gray-blue cytoplasm (Uwagie-Uro, *et al.*, 2017). Clinically, papillomavirus-induced rapid cell proliferation presents as papules, plaques, or nodules (Munday, *et al.*, 2017). These lesions can extend into the subungual space, worsening nail damage and leading to lameness, likely due to pain caused by subungual cyst formation and subsequent pyogranulomatous inflammation following cyst rupture and keratin release into surrounding tissues.

In many cases, papillomas resolve spontaneously, though some may persist for up to two years before regressing (Gould, *et al.*, 2021). In older dogs with a competent immune system, CPV2-associated papillomatosis on the footpads may resolve spontaneously following a biopsy (Iyori, *et al.*, 2019). According to Sudisma, *et al.*, (2016), surgical excision is recommended for tumor removal, regardless of location. Although benign, these tumors can cause complications if they enlarge in critical areas such as the eyelids, lips, or footpads (Sabattini, *et al.*, 2015). When complete surgical removal is not possible, radiation therapy may be an alternative treatment (Fulmer and Mauldin, 2007). Laser ablation is another therapeutic option that can effectively treat papillomas and enhance recovery outcomes (Rich, *et al.*, 2021).

Post-operative clinical observations indicated that the dog remained active on the first day following surgery, which may be attributed to the rapid induction and brief recovery period associated with ketamine anesthesia. However, several factors can heighten sensitivity to anesthetic toxicity, including prolonged fasting, pre-existing health conditions, dehydration, poisoning history, and specific disorders affecting the respiratory, cardiovascular, or renal systems (Sudisma, *et al.*, 2016). Wound healing is influenced by both local and systemic factors, such as the vascularization of the affected tissue, bacterial load, infection duration, and the presence of foreign material in the wound (Naomi, *et al.*, 2019). The administration of a combination of amoxicillin and clavulanic acid (Co-Amoxiclav) is a common practice for preventing postoperative infections and promoting recovery. While Co-Amoxiclav does not directly treat anemia, preventing infections is crucial for post-surgical recovery, as infections can exacerbate anemia by increasing oxygen demand and delaying healing. Thus, Co-Amoxiclav helps minimize infection risks and supports the overall recovery process. Postoperative care also included the use of chloramphenicol ointment to prevent anaerobic bacterial infections. Pain management was provided with tramadol, an opioid analgesic that modulates pain perception by binding to central nervous system receptors, similar to other opioid medications (Edinoff, *et al.*, 2024). Additionally, hemostatic agents containing tranexamic acid were administered to promote blood clotting by inhibiting fibrinolysis, thereby preventing fibrin degradation by plasmin (Monge, *et al.*, 2024). Hematodin, a hematopoietic agent containing taurine, ammonium ferric citrate, DL-methionine, histidine HCl, DL-tryptophan, cobalt acetate, cyanocobalamin, and anhydrous citric acid, was used to enhance red blood cell production and address postoperative anemia.

White turmeric *(Curcuma zedoaria Rosc.)* has demonstrated anticancer properties in various studies, highlighting its potential as a natural alternative therapy. Active compounds isolated from white turmeric include curzerenone, neocurdione, curdione, alismol, and zederone, as well as a sterol mixture. These compounds have been evaluated for their cytotoxic activity against cancer cell lines MCF-7, Ca-Ski, and HCT-116, with comparisons to non-cancerous fibroblast (MRC-5) and endothelial (HUVEC) cells. Curzerenone and alismol exhibited significant inhibitory effects on MCF-7, Ca-Ski, and HCT-116 cancer cell proliferation. Additionally, isocurcumenol was identified as another active compound capable of inhibiting cancer cell growth while maintaining low toxicity toward normal cells (Sagita, *et al.*, 2022). Coatex is a specialized supplement designed to promote healthy skin and coat in pets. It contains a blend of essential fatty acids, vitamins, and minerals that work synergistically to enhance skin health and coat strength. Recent research suggests that omega-3 and omega-6 fatty acids, along with vitamin E, can help manage various dermatological conditions in animals (Marchegiani, *et al.*, 2020). Clinical studies have demonstrated that consistent use of Coatex reduces symptoms such as itching and dryness while improving overall coat quality, making it a beneficial addition to pet care regimens.

CONCLUSION

The optimal treatment for canine papilloma is digit amputation. Post-operative care includes antibiotics, analgesics, anti-bleeding agents, anti-cancer medications, hematopoietic supplements, nerve supplements, and multivitamins. By the fifth postoperative day, the wound had dried, and the edges were healing well.

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CONFLICT of INTEREST

The author declares no conflict of interest in the authorship of

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ETHICAL APPROVAL

In this Case Study, there is no ethical approval needed.

AUTHORS' CONTRIBUTIONS

Conception and design of the study: JAS. Acquisition of data: DD, PPS. Analysis and/or interpretation of data: SEW, AS. Drafting the manuscript: JAS. Critical review/revision: AR

REFERENCES

Boehm, T.M.S.A., Bettenay, S., Bomhard, W., Majzoub-Altweck, M., Klinger, C.J., and Mueller, R.S., 2021. A Case Series of Canine Cutaneous Inverted Papilloma With One Case Showing Evidence of Recurrence. *Veterinary of Dermatology,* 32(3), 268-274.

Bronden, L.B., Eriksen, T., and Kristensen, A.T., 2010. Mast Cell Tumors and Other Skin Neoplasia in Danish Dogs. *Acta Veterinaria Scandinavica,* 52(1), 1-6.

Edinoff, A.N., Kaplan, L.A., Khan, S., Petersen, M., Sauce, E., Causey, C.D., Cornett, E.M., Imani, F., Moghdam, O.M., Kaye, A.M., and Kaye A.D., 2021. Full Opioid Agonists and Tramadol: Pharmacological and Clinical Considerations. *Anesthesiology and Pain Medicine,* 11(4), e119156.

Fulmer, A.K., and Maulidin, G.E., 2007. Canine hHistiocytic Neoplasia. *Canadian Veterinary Journal,* 48(10), 1041-1050.

Goldschmidt, M. H., Kennedy, J.S., Kennedy, D.R., Yuan, H., Holt, D. E., Casal, M. L., Traas, A. M., Mauldin, E.A., Moore, P.F., Henthorn, P.S., Hartnett, B.J., Weinberg, K., Schlegel, R., and Felsburg, P.J., 2006. Severe Papillomavirus Infection Progressing to Metastatic Squamous Cell Carcinoma in Bone Marrow-Transplanted X-linked SCID Dogs.*Virology,* 80, 6621–6628.

Gould, A.P., Coyner, K.S., Trimmer, A.M., Tater, K., and Rishniw, M., 2021. Canine Pedal Papilloma Identification and Management: A Retrospective Series of 44 Cases. *Veterinary Dermatology,* 32(5), 509–141.

Iyori, K., Inai, K., Hidekatsu, S., Haga, T., Shimoura, H., Imanishi, I., Imai, A., and Iwasaki, T., 2019. Spontaneous Regression of Canine Papillomavirus Type 2-Related Papillomatosis on Footpads in A Dog. *Journal of Veterinary Medical Science,* 81(6), 933-936.

Marchegiani, A., Fruganti, A., Spaterna, A., and Vedevo, E.D., 2020. Impact of Nutritional Supplementation on Canine Dermatological Disorders. *Veterinary Science,* 7(2), 38.

Medeiros-Fonseca, B., Faustino-Rocha, A.I., Mederos, R., Olivieira, P.A., and Gil Da Costa, R.M., 2023. Canine and Feline Papillomaviruses: An Update. *Frontiers in Veterinary science,* 10, 1-7.

Monge, K.M., Domene, S.S., Mendoza, D.L.D., Vidal-Gallardo, A., Llique, A.M.A., Rodriguez, M., Premchandra, P., Pandya, S.A., Arruarana, V.S., Paredes, K.A., and Martinez, E.C., 2024. Effectiveness of Tranexamic Acid in Trauma Patients: A Systematic Review. Cureus, 16(1), e52111.

Munday, J.S., Thomson, N.A., and Luff, J.A., 2017. Papillomaviruses in Dogs and Cats. *Veterinary Journal,* 225, 23–31.

Naomi, S., Prabowo, H., and Kurniawan, A., 2019. Faktor-Faktor Yang Memengaruhi Penyembuhan: Faktor Lokal, Faktor Tubuh Hewan, dan Lingkungannya. *Jurnal Veteriner dan Ilmu Kesehatan Hewan,* 12(4), 201-208.

Orlandi, M., Mazzei, M., Vascellari, M., Melchiotti, E., Zanardello, C., and Verin, R., 2021. Localization and Genotyping of Canine Papillomavirus in Canine Inverted Papillomas. *Journal of Veterinary Diagnostic Investigation,* 33(6), 1069–1078.

Reis, J.D.R., and Batista, M.V.A., 2022. New Insights into Canis Familiaris Papilloma Viruses Genetics and Biology: Is the Genetic Characterization of CPV Types and Their Variants an Important Clinical Issue?. *Genetics and Molecular Biology,* 45(3), 1-11.

Rich, N., Duclos, D., and Yuan, H., 2021. Management of Severe, Progressive Oral Papillomatosis in a Dog With CO2 Laser Ablation and Canine Papillomavirus L1 Immunisation. *Veterinary Record Case Reports,* 9(4), e168.

Sabattini, S., Bassi, P., and Bettini, G., 2015. Histopathological Findings and Proliferative Activity of Canine Sebaceous Gland Tumours with a Predominant Reserve Cell Population. *Journal of Comparative Pathology,* 152 (2–3), 145–152.

Schalm, O.W., 2010. Veterinary Hematology. 6th ed. Philadelphia: Lea and Febriger.

Smiech, A., Kamila, B., Wojciech, L., and Agata, P., 2023. Incidence and Risk of Occurrence of Benign and Malignant Canine Skin Tumours in Poland- a five-Year Retrospective Study. *Journal of Veterinary Research,* 67(3), 437-446.

Sudisma, I., Putra, M., Widianto, S., 2016. Penanganan Tumor Dengan Eksisi Total. *Jurnal Medis Indonesia,* 30(2), 45-50.

Uwagie-Ero, E.A., Abiaezute, C.N., Aimienwanlen, O.E., and James, O.A., 2017. Management of Canine Papillomatosis Using Oral Acyclovir – A Case Report. *International Journal of Veterinary Science,* 6(4), 187-190.

Wang, Z., Qi F., Luo, H., Xu, G., and Wang, D., 2022. Inflammatory Microenvironment of skin Wounds. *Frontiers in Immunology,* 13(1), 1-17.