VETERINARY CANCER SOCIETY

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Concurrent use of Chemotherapy and Immunocidin® for treatment of canine Lymphoma and Osteosarcoma

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Speaker Disclosure

Concurrent use of Chemotherapy and Immunocidin® for treatment of canine Lymphoma and Osteosarcoma

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FINAL DISCLOSURE:

Dr. Jeannette Kelly: No relevant financial relationship exists

Megan Padget: No relevant financial relationship exists

Dr. Miriam Cervantes: Employee of NovaVive Inc.

UNLABELED/UNAPPROVED USES DISCLOSURE:

I will discuss the results of a clinical trial for the agent Immunocidin that is currently NOT approved for intravenous use in animals

What is Canine Lymphoma?

- A malignant cancer that affects the lymphoid system (multicentric and extranodal forms exist)
- One of the most frequently diagnosed cancers in dogs (Merlo *et al*. 2008)
- Annual incidence: up to 107 cases per 100,000 dogs (Dobson *et al*. 2002)
- Predominantly affects middle-aged to older dogs
- Without treatment, survival is 4 – 6 weeks
- Systemic chemotherapy is the “standard of care”
- With multiagent chemotherapy protocols, median survival is 10 – 12 months

purdue.edu

What is Canine Osteosarcoma?

- An aggressive cancer characterized by lytic and proliferative bone lesions and high propensity for lung metastasis
- The most commonly diagnosed primary bone tumor in dogs
- Annual incidence: 13.9 cases per 100,000 dogs (Rowell *et al*. 2011)
- Predominantly affects middle-aged to older dogs
- Without treatment, survival is 3 – 5 months
- With amputation and chemotherapy, median survival is 8 – 12 months
- Multidrug chemotherapy and aggressive surgical techniques improve survival (quality of life can be affected)

greythealth.com

What is Immunocidin®?

- Immunocidin® is an immune stimulant approved in the USA and Canada for the intratumoral treatment of mixed mammary tumor and mammary adenocarcinoma in dogs
- Active ingredient: a **mycobacterial cell wall fraction** (MCWF) of the non-pathogenic, soil bacterium, ***Mycobacterium phlei***
- MCWF contains mycobacterial cell wall complexed with bacterial nucleic acid (DNA and RNA)
- Immunocidin® exhibits anti-cancer activity via **two mechanisms**

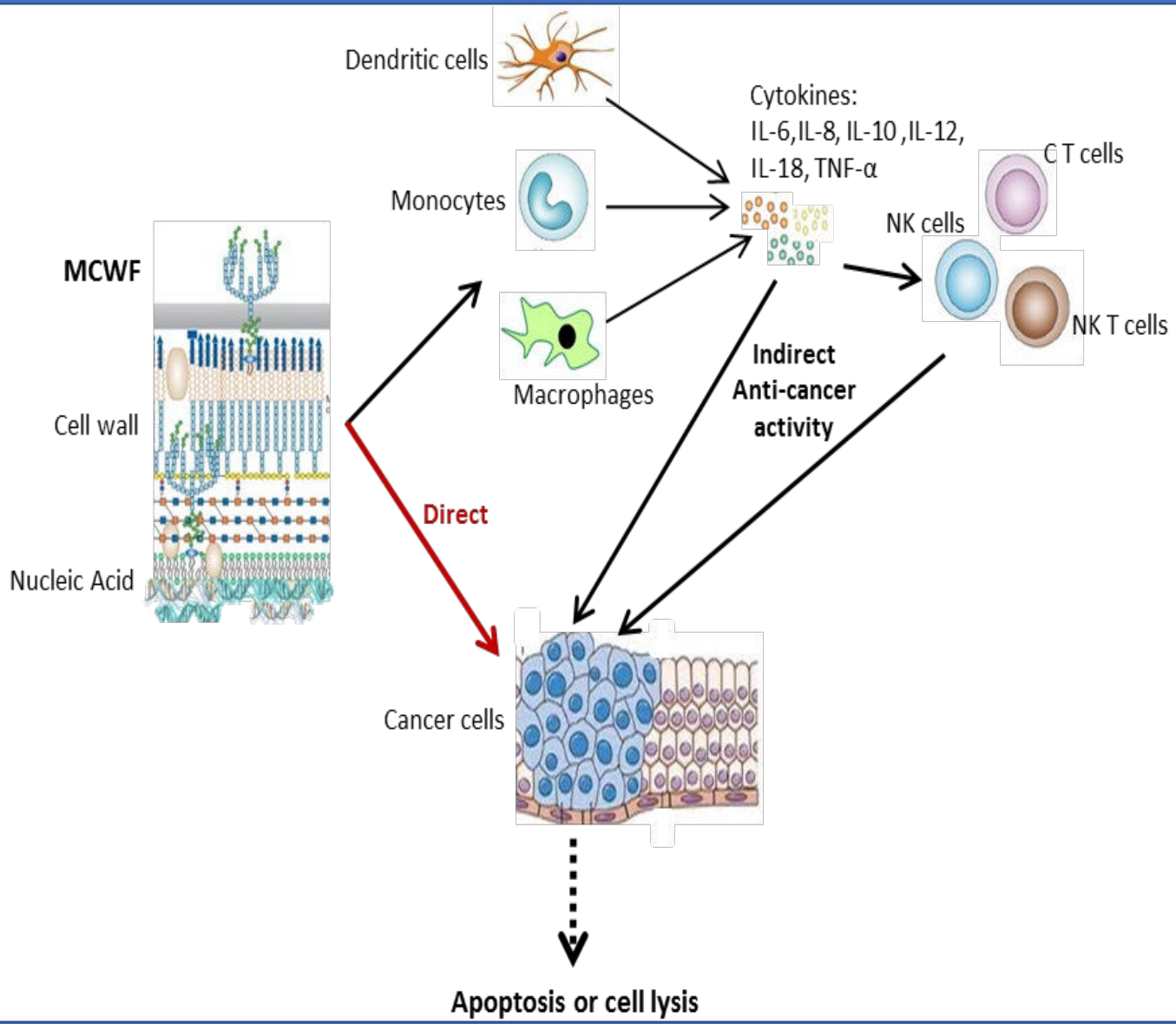
Immunocidin® – Mechanism of action

Induces apoptosis, reducing cancer cell division

(Direct)

Induces anti-cancer cytokines, and/or the stimulation of lymphocytes

(Indirect)



Objective

- To assess the effect of concurrent chemotherapy and Immunocidin® in dogs diagnosed with lymphoma or osteosarcoma

Study Design:

- Study was single site specific (Oncology referral clinic Veterinary Cancer Care)
- Retrospective study (2016-2019)

- Inclusion Criteria:
  - ✓ Confirmed lymphoma or osteosarcoma via cytology or histopathology
  - ✓ Chemotherapy treatment
  - ✓ Two or more Immunocidin treatments
  - ✓ Minimum of three months of follow-up after first Immunocidin treatment

- A total of 12 dogs met the inclusion criteria:
  - ✓ 8 Lymphoma patients
  - ✓ 4 Osteosarcoma patients

Santa Fe, NM, USA

Characteristics of the 12 canine patients

No patient	Sex	Age (years)	Breed	Diagnosis	Metastasis
1	Male	7.1	Basset Hound	Lymphoma	no
2	Female	8.6	Labrador retriever	Lymphoma	no
3	Female	10.3	Pembroke Welsh Corgi	Lymphoma	no
4	Male	10.3	Mixed-breed	Lymphoma	no
5	Male	10.4	Mixed-breed	Lymphoma	yes
6	Female	11.6	Cross breed	Lymphoma	no
7	Female	11.7	Akita	Lymphoma	no
8	Female	14.4	Cross breed	Lymphoma	no
9	Male	2.8	Cross breed	Osteosarcoma	yes
10	Male	7.3	Rottweiler	Osteosarcoma	no
11	Female	11.2	Cross breed	Osteosarcoma	yes
12	Female	11.5	German Shepherd	Osteosarcoma	yes

Immunocidin® Protocol

Dose ranges administered:

Body Weight (kg)	Immunocidin® dose (mL)
<5	0.1
5-10	0.2-0.25
10-15	0.3
15-25	0.5
25-35	0.75
>35	1

- Immunocidin® administered intravenously in all dogs, and intralesionally in two dogs
- Each dose **was diluted into 150 mL sterile 0.9% NaCl** and administered intravenously over 30 minutes
- Each patient was **pre-treated with diphenhydramine**
- Treatments given weekly or biweekly **on the same day following standard chemotherapy**
- **Lymphoma patients** received Doxorubicin and/or Vincristine, alone or combined with other chemo agents
- **Osteosarcoma patients** received Carboplatin or Carboplatin-Cisplatin-based chemotherapy

Results

Immunocidin patients

- Adverse events within hours of Immunocidin administration were mild, and primarily consisted of hyperthermia and lethargy
- Until the last reviewed follow-up (Sep 2019), 5 out of 12 dogs (42% of the patients) were still alive.

Sex	Age (yrs)	Breed	Diagnosis	Metastasis
F	8.6	Labrador retriever	Lymphoma	no
F	10.3	Pembroke Welsh Corgi	Lymphoma	no
M	10.3	Mixed-breed	Lymphoma	no
M	10.4	Mixed-breed	Lymphoma	yes
M	7.3	Rottweiler	Osteosarcoma	no

Concurrent use of Immunocidin and Chemotherapy and its effects on survival time

Diagnosis	Median Age (years)	Median Survival Time, (days) (range)	Median follow-up from 1st Immunocidin® (months) (range)	Median Number of Treatments (range)
Lymphoma (n = 8)	10.4	354 (135 – 1246)	10 (4 – 40)	6 (3 – 9)
Osteosarcoma (n = 4)	9.3	294 (104 – 653)	10 (3.5 – 21)	15 (4 – 24)

Conclusion

- Immunocidin® may have potential as a well-tolerated adjunct to chemotherapy for Lymphoma and Osteosarcoma

Prospective trials are warranted to evaluate standardized protocols combining chemotherapy and Immunocidin in the treatment of Lymphoma and Osteosarcoma

Questions?

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