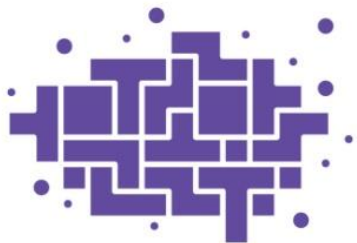


# Retrospective analysis of 101 canine lymphoma cases diagnosed in surgical biopsies in Latvia (2011 – 2020)

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# Lymphoma (lymphosarcoma)

- Common malignant tumor in dogs derived from clonally expanded lymphocytes (7-24% of all tumors)
- Not a uniform disease → clinically and morphologically diverse forms → can be diagnostic challenge
- Classification
  - Based on anatomical location and distribution
  - Based on cellular features and immunophenotype (WHO guidelines)
- No data about characteristics of lymphoma encountered in canine population in Latvia

# Objectives

Determine prevalence of lymphoma among surgical biopsy cases in Latvia during 10-year period in a private veterinary pathology service

Determine breed, age, sex characteristics of Latvian dogs affected by lymphoma

Determine characteristics of most common forms of lymphoma in biopsy submission from Latvian dogs: (anatomical location; morphological type and grade)

# Lymphoma – anatomical categories

Multicentric  
(peripheral LN)  
~ 75%

Alimentary  
~5-7%

Mediastinal  
~5%

Extranodal

Usefulness:  
correlation between clinical signs and distribution of lymphoma

# Lymphoma – WHO classification (histopathology)

- Cell size: small, intermediate, large
- Tissue distribution: diffuse vs nodular
- Grade: low, medium, high (mitoses)
- Immunophenotyping: T vs B cells



30  
different  
types of  
lymphoma

## Usefulness:

distinguish between high grade vs low grade (indolent) → more accurate prognosis and choice of treatment

# Materials and methods

- M.VPS data base searched for «limfoma» and «limfosarkoma» as definite diagnosis in Latvian dogs; total number of canine biopsy submissions extracted
- Data retrieved: breed, sex, age, clinical history, organs examined histologically, diagnosis and comments
  - Age categories <5 years; 5-10 years old; >10 years old
- Classification
  - Anatomical location and distribution (based on tissues submitted)
  - Cellular / tissue morphology and grade + IHC when available

# Prevalence of lymphoma among biopsy submissions from Latvian dogs (2011 – 2020)

| Year         | Total # of dog submissions | Lymphoma   |            |
|--------------|----------------------------|------------|------------|
|              |                            | n          | %          |
| 2011         | 113                        | 2          | 1.8        |
| 2012         | 176                        | 4          | 2.3        |
| 2013         | 230                        | 10         | 4.4        |
| 2014         | 367                        | 8          | 2.2        |
| 2015         | 409                        | 5          | 1.2        |
| 2016         | 501                        | 15         | 3.0        |
| 2017         | 558                        | 6          | 1.1        |
| 2018         | 635                        | 23         | 3.6        |
| 2019         | 673                        | 11         | 1.6        |
| 2020         | 693                        | 17         | 2.5        |
| <b>Total</b> | <b>4355</b>                | <b>101</b> |            |
| <b>Avg</b>   |                            |            | 2.3        |
| <b>Range</b> |                            |            | 1.1 -- 4.4 |
| <b>SD</b>    |                            |            | 1.0        |

- Considerable year-to-year fluctuation
- No apparent trend for increase in lymphoma submission prevalence

# Age, sex and breed characteristics of Latvian dogs diagnosed with lymphoma (2011 – 2020)

| Characteristic   | n      | %    |
|--|--------|------|
| <b>Age (years)</b>   |        |      |
| unknown  | 9      | --   |
| younger than 5 years   | 14     | 15.2 |
| 5-10 years old   | 63     | 68.5 |
| older than 10 years  | 15     | 16.3 |
| <b>Sex</b>   |        |      |
| Unknown  | 1      | --   |
| Male   | 58     | 58   |
| Female   | 42     | 42   |
| <b>Breed</b>   |        |      |
| Unknown  | 10     | --   |
| Mixed  | 12     | 18.7 |
| Rottweiler   | 7      | 7.7  |
| American Staffordshire terrier, French bulldog                                     | 6 each | 6.6  |
| Beagle   | 5      | 5.5  |
| German Shepherd dog  | 4      | 4.4  |
| English bulldog, Labrador retriever, Shar-pei, Dachshund, Golden Retriever         | 3 each | 3.3  |
| Bernese Mountain dog, Miniature Schnauzer, Doberman pinscher, Maltese, Toy terrier | 2 each | 2.2  |
| 21 different breeds  | 1 each | 1.1  |



# Case distribution based on anatomical form of lymphoma

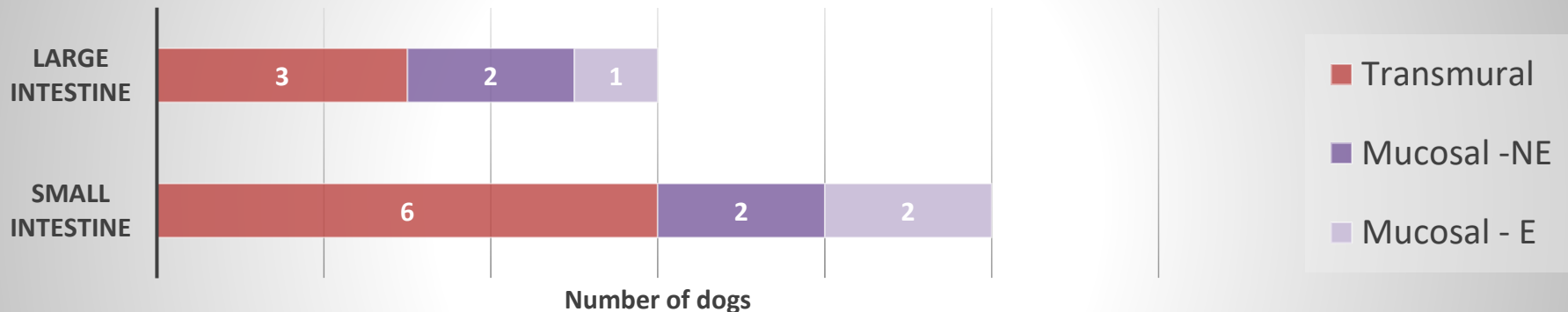
| Anatomical type               | Organs involved (based on tissues submitted)                             | n<br>(total<br>n = 101) | %  | Lymphoma<br>suspected before<br>biopsy<br>n (%) |
|-------------------------------|--|-------------------------|----|---|
| <b>Multicentric</b>           | One or multiple LN, +/- spleen   | 55                      | 55 | 39 (71%)  |
| <b>Alimentary</b>             | GI tract, +/- LN, +/- spleen, +/- liver, omentum, mesentery, oral cavity | 21                      | 21 | 5 (24%)   |
| <b>Skin and mucocutaneous</b> | Skin, mucocutaneous tissues, +/- LN                                      | 14                      | 14 | 3 (21%)   |
| <b>Splenic</b>                | Only spleen  | 6                       | 6  | 1 (17%)   |
| <b>Extranodal</b>             | Nasal, nasopharyngeal tissue, uterus                                     | 4                       | 4  | 1 (25%)   |
| <b>Mediastinal</b>            | Mediastinal lymph nodes, thymus  | 1                       | 1  | 1 (100%)  |

# Characteristics of cellular features of multicentric lymphoma (n=55)

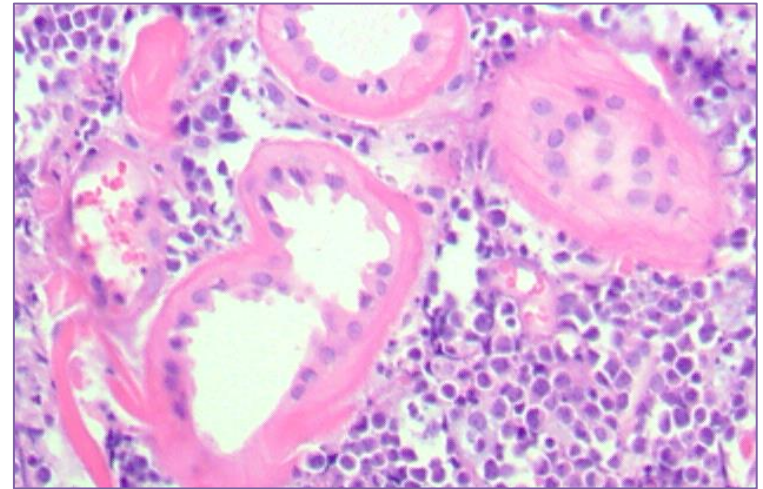
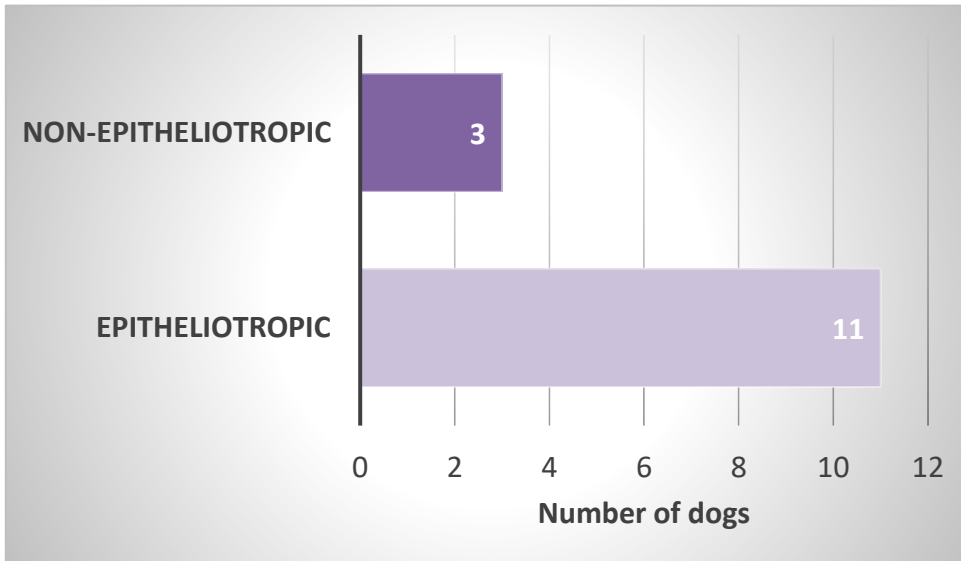
| Neoplastic cell distribution | Nuclear size of lymphocytes (Sm, In, Lg) | Grade based on mitotic rate (L, M, H) | # of cases | IHC results available | Presumptive lymphoma subtype noted in the report | Comments                              |
|------------------------------|--|---------------------------------------|------------|-----------------------|--|---------------------------------------|
| Diffuse                      | In, Lg                                   | M, H                                  | 17         | 0                     | 6 DLBCL<br>1 possibly T cell                     | Heterogeneous group – some aggressive |
| Diffuse                      | In, Lg                                   | L                                     | 20         | 1 (B cell)            | 1 DLBCL<br>1 B cell lymphoma                     | Low grade B and T cell lymphomas      |
| Diffuse                      | Sm                                       | L (n=8)<br>M (n=1)                    | 9          | 2 (T cell)            | 1 TZL<br>1 peripheral T cell<br>NOS              | TZL = indolent lymphoma               |
| Nodular                      | In, Lg                                   | L (n=6)<br>M (n=2)<br>H (n=1)         | 9          | 0                     | 2 FL<br>2 MZL                                    | FL and MZL = indolent lymphomas       |

# Characteristics of alimentary lymphoma (n=21)

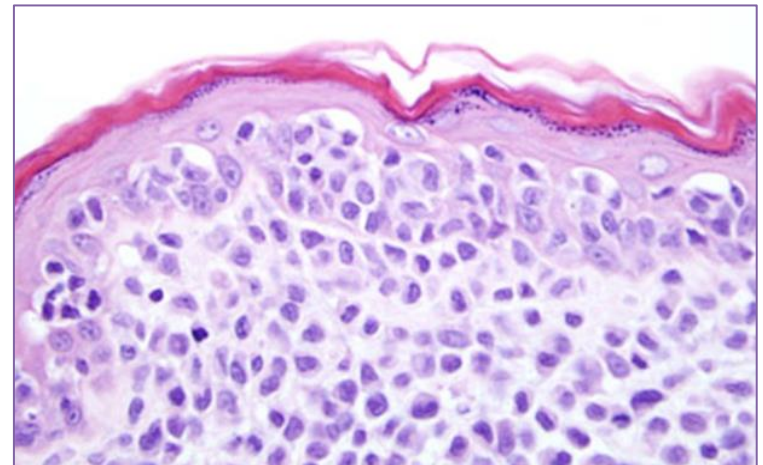
- Intestine (+/- mes. LN, liver, spleen, omentum) n=15
- Mesentery / mes. LN n=2
- Liver + spleen n=2
- Oral cavity n=2



# Characteristics of cutaneous and mucocutaneous lymphoma (n=14)



*Skin (apocrine glands), non-epitheliotropic lymphoma*



*Skin, epidermis -- epitheliotropic lymphoma*

# Conclusions

- Lymphoma in dogs in Latvia is a heterogenous disease
- No evidence of increase in prevalence of lymphoma in surgical biopsy submissions over ten-year period
- Most affected dogs were middle aged (median 8 years), with slight male predominance (58%). Rottweilers, American Staffordshire terriers and French bulldogs were top 3 breeds representing ~20% of cases
- Multicentric lymphoma was predominant anatomical type of lymphoma (55%) with alimentary and mucocutaneous lymphoma together forming about third of the cases
- Within multicentric lymphoma, two thirds were intermediate to large cell lymphomas corresponding with DLBCL; however, lack of IHC precluded complete WHO classification

# Conclusions / recommendations

- Even without IHC, histopathological examination can provide useful information to the clinicians – it is possible to distinguishing indolent lymphomas with slow disease course from aggressive lymphomas with short disease course
- We recommend that all large to intermediate cell lymphomas should be further characterized by IHC so more accurate prognosis could be provided to the animal owners
- We conclude that diagnostic investigation of potential lymphoma cases is very important for practice of evidence-based medicine and for demystification of lymphoma in dogs, especially since this disease can be treated with chemotherapy

