

# Rabbit Oncology

## Diseases, Diagnostics, and Therapeutics



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### KEYWORDS

- Lagomorphs • Neoplasia • Neoplastic disease • *Oryctolagus cuniculus*
- Lymphoma • Thymoma • Uterine adenocarcinoma • Viral-induced tumors

### KEY POINTS

- Rabbits may suffer from similar neoplastic diseases as other companion animals, with a tumor incidence reported of 0.5% to 2.7% across the entire rabbit population.
- Common tumors include uterine adenocarcinoma, lymphoma/leukemia, thymoma, mammary gland tumors, and cutaneous neoplasia; other tumor types may also be diagnosed, but seem to occur less frequently.
- Diagnostic workup follows similar guidelines as in other animals and aims to determine the location, type, and extent of the tumor; the clinical stage; and presence of comorbidities.
- Surgery remains the most commonly used method to treat neoplasia in rabbits, but other therapeutic modalities can be used as primary treatment or in conjunction with surgery.
- Preventive measures include ovariectomy, insect control, and vaccination, which are aimed at reducing the incidence of uterine and mammary neoplasia and transmission of viruses known to cause neoplasia, respectively.

### INTRODUCTION

Over the past decades, the popularity of rabbits as pets has risen considerably. Together with the increased quality of (veterinary) care and concomitant increases in the rabbits' life expectancy, this has likely led to an increase in the number of rabbits diagnosed with geriatric diseases and neoplasia. Although the actual incidence of spontaneously occurring neoplasia in the rabbit is difficult to provide, retrospective studies have suggested prevalences of 0.5% and up to 2.7% across the entire rabbit population.<sup>1–3</sup> Similar to other animals, older rabbits are more likely to be diagnosed with tumors, with a profound increase in the incidence of neoplastic disease (from 1.4% to 8.4%) reported after the second year of life.<sup>2</sup> These neoplastic changes predominantly involve the urogenital, hemolymphatic, and integumentary systems, with

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uterine neoplasia and lymphoid tumors being the 2 most predominant tumor types. Other tumor types have also been reported in rabbits, but their incidence seems to be much lower, with most of the information being derived from anecdotal evidence and case reports. Nevertheless, the knowledge with regard to rabbit oncology has grown considerably over the past years whereby the availability of new, more advanced diagnostic techniques and treatment modalities have greatly improved the abilities to accurately and appropriately diagnose and manage neoplastic disease in the domestic rabbit.

In this article, the different diagnostic steps and therapeutic interventions that can be considered when confronted with a rabbit suspected of a neoplasia are discussed. In addition, an overview will be given of the various spontaneously occurring neoplasia that have been reported in rabbits, whereby the most commonly seen tumors will be discussed in greater detail.

## DIAGNOSTIC EVALUATION

As with any disease, the workup of a patient with (suspected) neoplasia starts with a thorough history and full physical examination, followed by additional diagnostic tests. The major goals of this diagnostic evaluation are to assess the following:

- Location of the tumor,
- Size and local invasiveness of the tumor,
- Tumor type, including biologic activity of the tumor,
- Stage of the disease, including regional and distant metastases, and
- Presence of concurrent disease, secondary complications, and paraneoplastic syndromes that may influence the treatment options and outcome.

### ***Signalment, History, and Physical Examination***

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Various types of neoplasia are known to affect rabbits of a specific age, sex, or breed. Familiarity with these predispositions may aid in the diagnosis. Examples of tumor predilections in rabbits include:

- Age: most tumors are seen in older patients, but lymphomas and papillomas can also be found in rabbits less than 2 years.<sup>3</sup>
- Sex: although mammary tumors may develop in both sexes, females are most prone.
- Breed: uterine tumors are often seen in, for example, Dutch breeds.<sup>3</sup>

Aside from the signalment, the history may also provide information on potential risk factors such as (lack of) neutering and vaccination status. If the patient is presented with an external mass (**Fig. 1**), specific information needs to be obtained regarding the mass' time of onset, duration, growth rate, and (response to) previous treatment. Moreover, the history should include an evaluation of the potential systemic effects of the neoplasia, which will induce changes in, for example, the rabbit's behavior, activity level, appetite, body condition, or breathing. However, in many rabbits the neoplastic process itself will go unnoticed by the owner (eg, in case of an abdominal mass). As a result, the clinical presentation may be more variable, ranging from unspecific signs (eg, inappetence, weight loss, lethargy, depression) to signs resulting from the local or systemic effects of the neoplasia (eg, hematuria, gastric bloat or gut stasis, dyspnea).

Internal and external masses may occasionally be identified as coincidental findings during a routine physical examination (**Fig. 2**). Any mass that is identified

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