

Advancing Cancer Therapies Through the One Health Approach: The Role of Veterinary and Comparative Oncology in Human and Animal Patient Care

Napredek pri zdravljenju raka z uporabo pristopa Eno zdravje: vloga veterinarske in primerjalne onkologije pri zdravljenju ljudi in živali

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The landscape of human health problems in the last several decades has markedly changed due to life sciences development. Non-communicable (chronic) diseases have become the leading causes of death, with several types of cancer ranking among the top causes globally (1). As in humans, and also in veterinary medicine, the landscape of the disease burden is changing. In small animal practice in particular. Cancer is among the most common causes of death for dogs (and cats) in the developed world, even though it is uncommon in wildlife and other domestic animals (2). Dogs get cancer at roughly the same rate as humans, while there is less information about the rate of cancer in cats.

Over the past 50 years, there have been significant advances in basic cancer research, leading to improved preventive measures, diagnostic tools, and treatments. However, therapy resistance and progression to metastatic disease continue to limit improvements in patient survival rates, even with the recent advancement of immunotherapy, the latest breakthrough in cancer management (3). Moreover, cancer survivors often experience a lower quality of life due

V zadnjih desetletjih je zaradi napredka v znanosti o življenju prišlo do pomembnih sprememb v razumevanju in obravnavi zdravstvenih težav pri ljudeh. Nenalezljive (kronične) bolezni so postale vodilni vzrok smrti, pri čemer se več vrst raka uvršča med glavne vzroke smrtnosti na globalni ravni (1). Podobno kot pri ljudeh se tudi v veterinarski medicini spreminja narava bremena bolezni, zlasti v praksi malih živali. V razvitem svetu je rak eden najpogostejših vzrokov smrti pri psih (in mačkah), medtem ko se pri divjih živalih in drugih domačih vrstah redko pojavlja. Pojavnost raka pri psih je primerljiva s tisto pri ljudeh, medtem ko je podatkov o pogostosti raka pri mačkah manj.

V zadnjih petdesetih letih je bil dosežen izjemen napredek na področju temeljnih raziskav raka, kar je omogočilo pomembna izboljšanja pri preventivnih ukrepih, diagnostičnih metodah in možnostih zdravljenja. Kljub temu pa odpornost proti zdravljenju in napredovanje bolezni v metastatsko fazo še vedno predstavljata glavno oviro pri izboljšanju preživetja bolnikov, tudi ob nedavnih dosežkih na področju imunoterapije, ki velja za enega najnovejših prebojev v zdravljenju raka (3). Poleg tega se mnogi preživeli bolniki z rakom soočajo

to the systemic effects of tumors and the side effects of treatments (4).

Comparative oncology and collaboration between human and animal cancer researchers and clinicians are critically important to improve the prevention, diagnosis, and treatment of cancer in animals, and translate the research and knowledge between the two fields to benefit people with cancer. Several comparative cancer centers have been at the forefront of comparative cancer research in the United States and Europe. At the University of Ljubljana Veterinary Faculty (my alma mater), there are more than 20 years of comparative oncology research (see Editorial In the spotlight in this issue for more details). Recently, we also launched the Texas Center for Comparative Cancer Research (TC3R) at the Texas Tech University School of Veterinary Medicine (my current position as assistant professor) to help in the efforts to advance the prevention, diagnosis, and treatment of cancers in both humans and animals with evolutionary, transdisciplinary and comparative approaches (5).

At the Slovenian Veterinary Research Journal, we occasionally publish articles related to the field of comparative oncology (6, 7). Given the significance of the topic and to encourage further transdisciplinary collaboration, we have decided to dedicate special issues to comparative oncology, with this being the first. This collection of articles highlights the importance of understanding the similarities and differences in cancer susceptibility, disease aggressiveness, and treatment response between animals and humans, aiming to advance therapeutic opportunities for both.

Nataša Tozon highlights the developments and collaborations in comparative oncology over the past 20 years at the University of Ljubljana. Breznik and coauthors review the literature on the role of the gut microbiome in cancer and its impact on outcomes for both human and animal patients. Švara and collaborators present data on the incidence and types of canine tumors in Slovenia over the last 20 years. Ozmen et al. provide a transcriptomic analysis of canine hemangiosarcoma, while Belma et al. discuss the metastases of ovine pulmonary adenocarcinoma. Lastly, Hatipoglu et al. offer a case report on undifferentiated embryonal rhabdomyosarcoma in a German Shepherd dog.

This is the first set of articles devoted to comparative oncology. If you have exciting research, case reports, or review articles on this topic to contribute, please consider submitting to our next one!

s slabšo kakovostjo življenja, ki je posledica sistemskih učinkov tumorjev in stranskih učinkov zdravljenja (4).

Primerjalna onkologija ter sodelovanje med raziskovalci raka pri ljudeh in živalih ter kliniki igrata ključno vlogo pri izboljšanju preprečevanja, diagnostike in zdravljenja raka pri živalih, hkrati pa omogočata prenos raziskav in znanja med obema področjema v korist bolnikov z rakom. Več centrov za primerjalno onkologijo v Združenih državah Amerike in Evropi je v ospredju primerjalnih raziskav raka. Na Veterinarski fakulteti Univerze v Ljubljani (moji almi mater) se že več kot dvajset let ukvarjajo s primerjalnimi onkološkimi raziskavami (za podrobnosti glej uvodnik V središču pozornosti v tej številki). Nedavno smo na Veterinarski fakulteti Univerze Texas Tech (moje trenutno delovno mesto docenta) ustanovili Teksaški center za primerjalne raziskave raka (TC3R), ki s pomočjo evlucijskih, transdisciplinarnih in primerjalnih pristopov prispeva k napredku na področju preprečevanja, diagnostike in zdravljenja raka pri ljudeh in živalih (5).

V Slovenskem veterinarskem zborniku občasno objavljamo prispevke s področja primerjalne onkologije (5, 6). Zaradi pomembnosti te teme in z namenom spodbujanja nadaljnjega transdisciplinarnega sodelovanja smo se odločili, da primerjalni onkologiji posvetimo posebne številke, pri čemer je ta prva v nizu. Zbirka člankov poudarja pomen razumevanja podobnosti in razlik v dovzetnosti za raka, agresivnosti bolezni in odzivu na zdravljenje med ljudmi in živalmi, da bi se izboljšale terapevtske možnosti za oboje.

Nataša Tozon predstavlja razvoj in dosežke na področju primerjalne onkologije v zadnjih dvajsetih letih na Univerzi v Ljubljani. Breznik s soavtorji prinaša pregled literature o vplivu črevesnega mikrobioma na razvoj raka in izid zdravljenja pri ljudeh in živalih. Švara s sodelavci analizira podatke o pojavnosti in vrstah tumorjev pri psih v Sloveniji v zadnjih dveh desetletjih. Ozmen in sodelavci predstavljajo transkriptomsko analizo pasjega hemangiosarkoma, medtem ko Belma in sodelavci obravnavajo metastaze pljučnega adenokarcinoma pri ovcah. Hatipoglu s soavtorji zaključuje s poročilom o primeru nediferenciranega embrionalnega rabdomiosarkoma pri nemškem ovčarju.

To je prvi sklop člankov, namenjen primerjalni onkologiji. Če imate zanimive raziskave, poročila o primerih ali pregledne članke s tega področja, vas vabimo, da jih predložite za objavo v eni izmed naslednjih števil!

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