**Pia Pužar Dominkuš**

## ZUNAJCELIČNI VEZIKLI KOT MEDCELIČNI KURIRJI

Zunajcelični vezikli (ZV) so z membrano obdani delci, ki jih celice izločajo v zunajcelični prostor tako *in vivo*, kot tudi *in vitro*. Glede na velikost in mesto nastanka v celici jih delimo na tri podskupine: eksosome, mikrovezikle in apoptotska telesca. Delujejo kot medcelični sporočevalci, ki med celicami prenašajo biomolekule, vzdržujejo ravnovesje in uravnavajo fiziološke funkcije celic. Najdemo jih v skoraj vseh bioloških tekočinah, med drugim v krvi, cerebrospinalni tekočini, urinu in slini. ZV imajo pomembno vlogo tudi v različnih bolezenskih stanjih, kjer prispevajo k nastanku in širjenju tumorjev, dostavljajo škodljive proteine pri nevrodegenerativnih boleznih in olajšujejo širjenje virusnih okužb v organizmu. Pri okužbi z virusom humane imunske pomanjkljivosti (HIV) so prizadete celice imunskega sistema, okužba pa se lahko razširi tudi na osrednji živčni sistem, kar vodi do nevrokognitivnih motenj. Virusni protein Nef igra pomembno vlogo pri razvoju virusne okužbe, saj vpliva na celično signaliziranje in metabolizem ter poveča kužnost virusa. V nedavnih študijah smo pokazali, da Nef preko izločanja ZV spodbuja lastno izločanje iz celic imunskega sistema, ki izražajo Nef. Pri tekočih raziskavah smo se osredotočili na ZV iz človeških možganskih celičnih linij astrocitov in mikroglij, ter vpliv izražanja proteina Nef ali okužbe celic z virusom HIV-1 na njihovo izločanje. Pokazali smo, da astrociti, ki izražajo Nef protein ali so okuženi z virusom HIV-1 izločajo ZV, ki vsebujejo Nef. V primerjavi s kontrolo se izločanje ZV iz astrocitov, ki izražajo Nef poveča.

ZV imajo velik klinični potencial, kot biooznačevalci v diagnostiki in prognostiki ter kot sredstvo za terapijo in dostavo zdravilnih učinkovin. Zato je razumevanje njihovega nastanka in delovanja pri različnih bolezenskih stanjih ključno za napredek na področju njihove klinične uporabnosti.

## EXTRACELLULAR VESICLES AS INTERCELLULAR MESSENGERS

Extracellular vesicles (EVs) are small membrane particles, released from cells *in vivo* and *in vitro*, in physiological, as well as pathological conditions. They are divided into three groups, according to their size and site of formation: exosomes, microvesicles and apoptotic bodies. EVs were found in almost all biological fluids, including blood, cerebrospinal fluid, urine and saliva. They transfer biomolecules between cells, maintain homeostasis and regulate physiological functions of cells. However, in pathological conditions they were shown to contribute to oncogenesis, transfer toxic proteins in neurodegenerative diseases and facilitate viral spread in viral infections. In human immunodeficiency virus (HIV) infection, cells of the immune system are affected, but infection may also spread to the central nervous system, leading to neurocognitive disorders. HIV-1 Nef is a viral protein, which plays an important role in viral pathogenesis, as it affects cell signalling, metabolism and increases viral infectivity. We previously showed that Nef stimulates its own release from Nef-expressing immune cells via EVs. The focus of our current study is the effect of Nef protein expression or HIV-1 infection on the release of EVs from human brain cell lines, including astrocytes and microglia. We showed that Nef-expressing or HIV-1 infected astrocytes release EVs, which contain Nef protein. Additionally, Nef-expression increases the secretion of EVs in comparison to control.

EVs have great clinical potential as disease biomarkers and drug delivery systems. Thereby, understanding the mechanisms of EV formation and function in different pathological conditions is crucial for the advancement in their clinical implementation.

**Nejc Bezak**

## SUSPENDIRANE SNOVI ALI ZAKAJ SO VODOTOKI KALNI

Suspendirane snovi oziroma lebdeče plavine so pomemben okoljski dejavnik, ki so povezane s številnimi aktualnimi problematikami, tako lahko npr. v akumulacijskih bazenih hidroelektrarn prihaja do usedanja suspendiranih snovi, kar povzroča zmanjševanje volumna akumulacije, kar je neugodno z vidika izrabe vodne energije ter poplavne varnosti. Poleg tega lahko suspendirane snovi povzročijo poškodbe na betonskih konstrukcijah vodnih zgradb. Pri tem pa je potrebno poudariti, da sedimenti ne povzročajo vedno zgolj negativnih vplivov, saj gre za naravni pojav, negativni vplivi pa so povezani predvsem s človeškimi aktivnostmi.

V okviru predstavitve bo podana definicija suspendiranih snovi ter opisani bodo pogoji pri katerih lahko pride do povečanega transporta suspendiranih snovi. Poleg tega pa bodo izpostavljene tudi nekatere bistvene ugotovitve, ki so bile pridobljene v okviru raziskav povezanih s transportom sedimentov ter erozijskimi procesi.

## SUSPENDED SEDIMENTS OR WHY ARE STREAMS TURBID

Suspended sediment loads are relevant environmental factor that is connected with several important issues (environmental and others), such as: sediment deposition in hydropower plants accumulation reservoirs can lead to reduction of effective accumulation reservoir volume, which is problematic from the electricity production point of view and flood safety. Moreover, suspended sediment transport can also cause damage on the concrete hydro-technical structures. However, it should be noted that suspended sediments are not related just with negative environmental (and others) issues, because sediment transport is part of the natural erosion-sedimentation cycle and negative consequences are mostly connected with human activities.

In the scope of the presentation an introduction to the suspended sediment basics will be made and the description of conditions that can lead to increased suspended sediment loads will be given. Moreover, some of the main findings of studies that were performed in order to enhance the knowledge about sediment transport and erosion processes will be stressed out.

**Ana Slavec**

DRUŠTVO MLADIH RAZISKOVALCEV SLOVENIJE

## IZBOLJŠEVANJE UBESEDITVE ANKETNIH VPRAŠANJ Z JEZIKOVNIMI VIRI

Besede, ki jih pogosto uporabljamo v vsakdanjem govoru, prepoznamo in obdelamo hitreje kot besede, ki jih uporabljamo manj pogosto. Zato je v situacijah, kot je oblikovanje anketnih vprašanj, ko je povečevanje razumljivost besedila osrednjega pomena, zaželena uporaba običajnejših izrazov. Nepoznani izrazi so bili v literaturi namreč izpostavljeni kot ena od značilnosti besedila, ki vpliva na njegovo razumljivost. Kot so pokazale pretekle raziskave, lahko težave z razumljivostjo pomenijo povečano breme za anketiranca, daljši čas odgovorov, več neodgovorov spremenljivke, več prekinitev odgovarjanja in druge neželene vzorce odgovarjanja, ki vodijo do nižje kakovosti odgovorov. V določeni meri lahko težave z razumljivostjo anketnih vprašanj zaznamo z metodami predtestiranja in evalvacije vprašalnikov, kot so kognitivni intervjuji in ekspertne ocene. Obe metodi lahko potencialno napovesta problematična vprašanja, vendar so manj poznani izrazi specifičen problem, ki ga ni enostavno zaznati.

V doktorski disertaciji sem razvila nov pristop, ki temelji na jezikovnih virih, kot so besedilne korpusi in leksikalne baze, ki bi lahko razvijalcem anketnih vprašalnikov služil kot dopolnilo tradicionalnim metodam evalvacije vprašanj. Besedilni korpusi so namreč velike zbirke besedil v naravnem okolju, ki se lahko uporabijo kot mera (ne)poznanosti določenega izraza. Višja je frekvenca v korpusu, bolj je beseda poznana splošni populaciji. Poleg tega lahko uporabimo še leksikalne baze, in sicer kot vir sopomenk in drugih alternativnih ubeseditev, s katerimi lahko potencialno problematične besede zamenjamo s pogostejšimi alternativami, po možnosti z enakim pomenom.

## IMPROVING SURVEY QUESTION WORDING USING LANGUAGE RESOURCES

Words commonly used in daily speech are recognised and processed more quickly than words that are less commonly used. Thus, the use of more common words is preferred in contexts where maximising text comprehensibility is of central importance, which is usually also the case in survey questions. In fact, unfamiliar words have often been indicated in the literature as one of the text features that can affect question comprehensibility. As previous studies have shown, comprehensibility issues might lead to an increase in response burden, longer response times, more item non-response and drop-outs, and other undesired respondent behaviour that can decrease response quality. To a certain extent, comprehensibility problems in survey questions can be detected with pre-testing and evaluation methods, such as cognitive interviews and expert reviews. Both have been shown to have the potential to positively predict problematic questions; however, unfamiliar words are a specific problem that might not be detected easily.

In this dissertation, a new approach based on language resources, including text corpora and lexical databases, is proposed to assist questionnaire designers as a supplement to traditional question evaluation methods. Text corpora are large samples of language in natural contexts that can be used as estimates of wording unfamiliarity. The higher the frequency in corpora, the more familiar a word is to the general population. In addition, lexical databases are used as a source of word synonyms and other alternative wordings that can replace a potentially problematic word with a higher frequency wording, preferably with the same meaning.