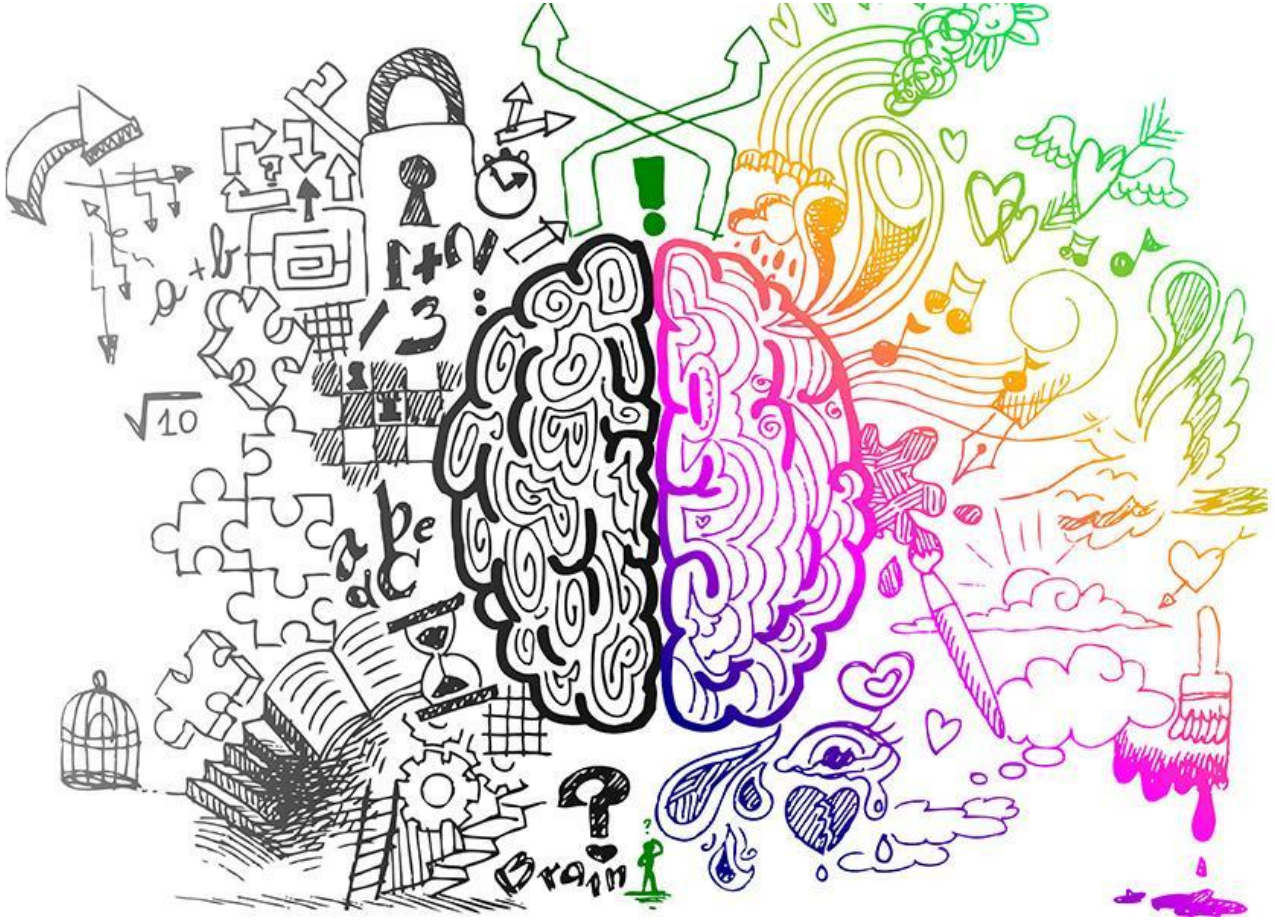
Naučni seminar CNIRS-a, 18.11.2019

Kao napisati naučni rad?

Milica Kovačević Filipović, profesor

Fakultet veterinarske medicine, Univerzitet u Beogradu

Zašto naučni rad?



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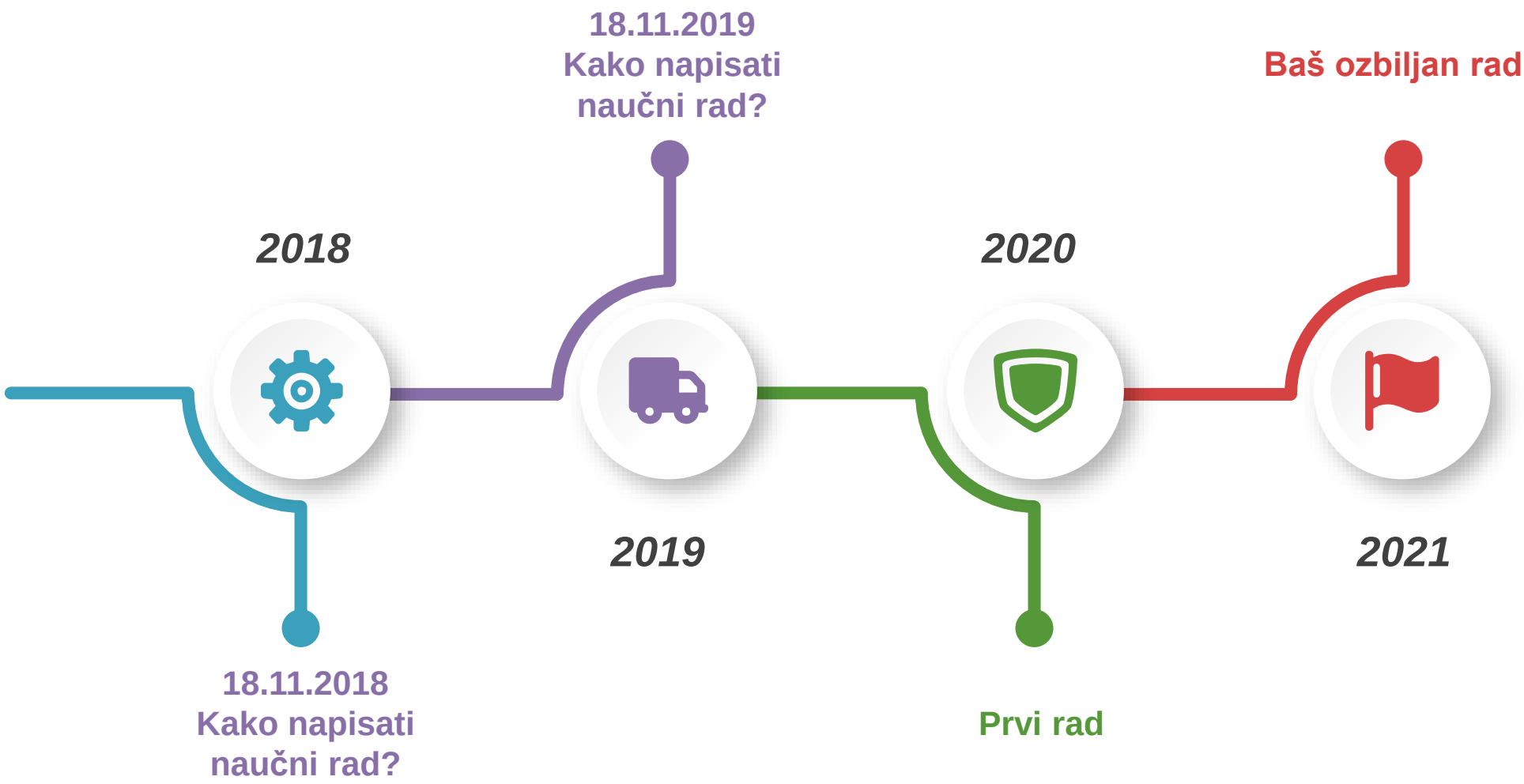

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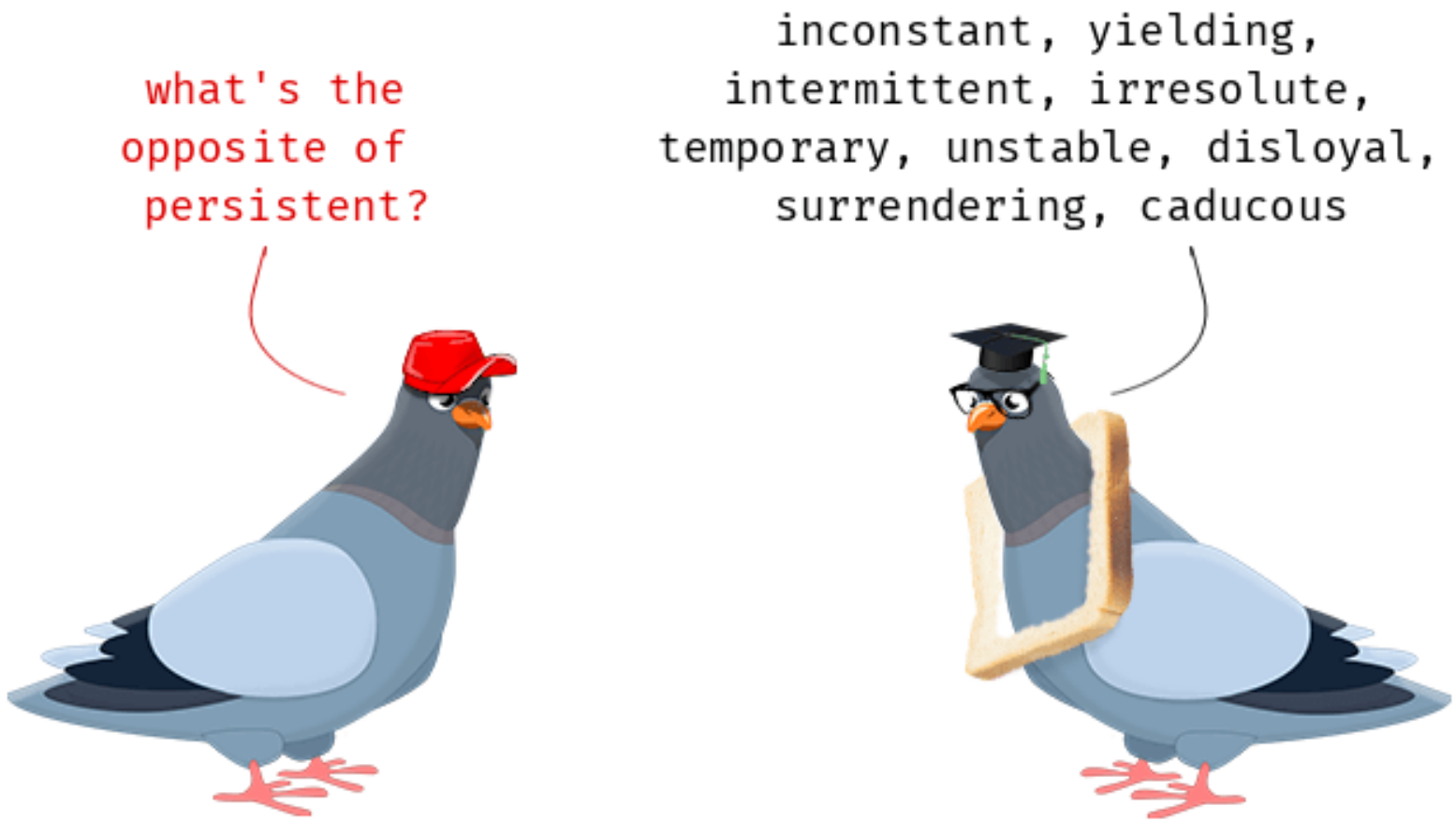

Delovi rada

- Naslov / Title
- Apstrakt ili kratki sažetak / Abstract
- Uvod / Introduction
- Materijal i metode / Material and methods
- Rezultati / Results
- Diskusija / Discussion
- Zahvalnica / Acknowledgment
- Literatura / Reference

Companion or pet animals

Veterinary Record Open

OPEN ACCESS

Incidence of surgical site infection in dogs undergoing soft tissue surgery: risk factors and economic impact

Jorge Espinel-Rupérez ,[1] Maria Dolores Martín-Ríos,[2] Veronica Salazar,[3] Maria Rosario Baquero-Artigao,[4] Gustavo Ortiz-Díez[1]

To cite: Espinel-Rupérez J, Martín-Ríos MD, Salazar V, *et al*. Incidence of surgical site infection in dogs undergoing soft tissue surgery: risk factors and economic impact. *Veterinary Record Open* 2019;**6**:e000233. doi:10.1136/vetreco-2017-000233

Received 16 June 2017
Revised 28 June 2019
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ABSTRACT

Objectives To determine (1) the incidence of surgical site infection (SSI) in patients undergoing soft tissue surgery at a veterinary teaching hospital and to study (2) and describe the main risk factors associated with SSI and (3) assess the economic impact of SSI.

Design Prospective cohort study.

Setting Veterinary teaching hospital.

Participants 184 dogs undergoing soft tissue surgery during a 12-month period (October 2013 to September 2014).

Primary outcome measure Surgical site infection.

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Despite the small number of studies and the early stages of implementation of SSI

Vet Rec Open: first published as 10.1136/vetreco-2017-000233 on 5 October 201

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Conclusions The incidence of SSI was higher than the incidence reported in other published studies, although they were within expected ranges when a surveillance system was implemented. This incidence correlated with an increase in costs. Additionally new important risk factors for its development were detected.

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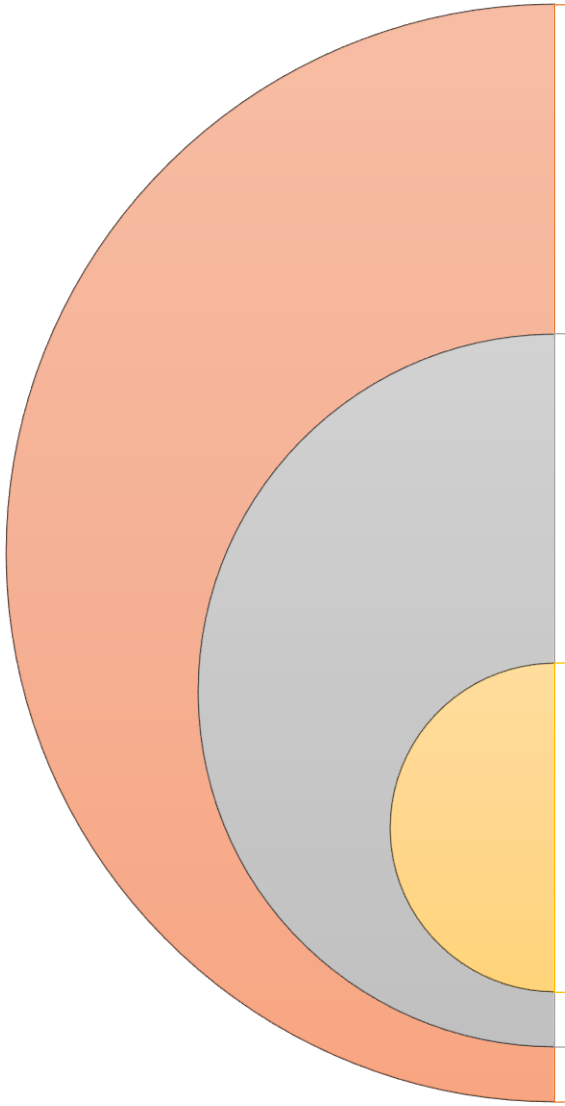
Despite the small number of studies and the early stages of implementation of SSI surveillance systems in veterinary medicine, the hypothesis of this study was that the incidence of SSI would be higher than that estimated in human medicine and that the risk factors associated with SSI would be similar to those existing in human medicine.

For all of these reasons, the objectives of this study were to determine the incidence of SSI in patients undergoing soft tissue surgery at a veterinary teaching hospital and to study and describe the main risk factors associated with SSI and to evaluate their economic impact.

MATERIALS AND METHODS

A prospective cohort study was performed. Canine patients that underwent surgery at a veterinary teaching hospital performed



Šta već znamo o problemu koji želimo da ispitamo?

Šta ne znamo?

Kako mi možemo da popunimo prazninu u znanju?

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[3]Department of Anaesthesia, Universidad Alfonso X El Sabio, Madrid, Spain
[4]Microbiology Department, Universidad Alfonso X El Sabio, Madrid, Spain

INTRODUCTION

Surgical site infection (SSI) is one of the most common surgical complications. These infections are responsible for an increase in morbidity, mortality, prolonged hospital stay, increased costs and a negative impact on the emotional state of the owner.[1–7]

In human medicine, a number of studies evaluate SSI in hospital and state-wide. However, that is not the case in veterinary medicine, where the development of this type

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MATERIALS AND METHODS

A prospective cohort study was performed. Canine patients that underwent surgery at a veterinary teaching hospital performed by the Soft Tissue Surgery Service were the population investigated in this study. Both male and female canine patients of all ages that required soft tissue surgery during the study period and who met the inclusion criteria were included in the study. Inclusion criteria included: soft tissue surgery carried out between October 2013 and September 2014. Dental, ophthalmological, orthopaedic and neurological procedures were excluded.

The data were collected from the clinical management software used in the hospital

status, breed, underlying pathology, administered treatments and number of follow-up appointments), presurgical variables (type of intervention, degree of contamination of the surgical procedure, type of surgical scrub of staff and patient, clipping performed under anaesthesia and laboratory abnormalities), personnel variables (identity of surgical, anaesthetic and auxiliary personnel, number of staff present in the operating room, undergraduate students involved in the surgical procedure), anaesthetic variables (American Society of Anesthesiologists (ASA) status classification, maintenance anaesthetic agent, locoregional blocks, existence of hypotension and hypothermia episodes), surgical variables (anaesthesia and surgery duration, use of drains, skin suture pattern, use of electrosurgery, scheduling nature of procedure, type of sterilisation system programme, surgical room where procedure was performed, reintervention) and postoperative variables (hospital stay, administration of postoperative antibiotics, blood products transfusion administration, feeding tube, urinary catheterisation and use of Elizabethan collar).

An active surveillance system was used. Patients were checked up at the hospital by trained personnel on days 5 and 10 after surgery. The researcher did the final follow-up visit over the phone on day 30 after surgery. SSI was diagnosed and classified using the definition system[1010] described in table 1.

Categorical variables are expressed as rates per cent and measurable variables are expressed as mean (sd) and 95% CI. Categorical variables were compared by the Pearson chi-squared test with continuity correction or Fisher's exact test when at least 25 per cent of values showed an expected cell frequency below 5. Quantitative variables were compared by the Student's *t* test after evaluation of normal distribution test (Kolmogorov-Smirnov) and equality of variances. Quantitative variables without normal distribution were analysed by Mann-Whitney U test. All statistical analyses were performed with the use of SPSS software (V.17.0), and all reported probability values were two sided. Significance was assumed at the 5 per cent level ($P<0.050$).

The economic impact was analysed following the same methods used previously in both human and veterinary medicine models. Costs were classified as presurgical costs, surgical costs and postsurgical costs. The difference between the SSI group and the healthy group was expressed by mean difference and percentage increase.

RESULTS

A total of 184 surgical procedures were included in the study, of which 16 (8.7 per cent) developed SSI. Classification of SSI by type of surgery and type of infection is represented in table 2. The percentage of females (56.5

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Table 2 Classification of SSI

	Superficial n (%)	Deep n (%)	Organ/space n (%)
Global 16 (8.7%)	13 (81.3)	2 (12.5)	1 (6.3)
Type of surgical procedure			
Dermatological	4 (80)	1 (20)	0 (0)
Gastrointestinal	3 (75)	0 (0)	1 (25)
Endocrine	0 (0)	0 (0)	0 (0)
Spleen	1 (100)	0 (0)	0 (0)
Ear	0 (0)	0 (0)	0 (0)
Peritoneal	1 (50)	1 (50)	0 (0)
Reproductive	4 (100)	0 (0)	0 (0)
Respiratory	0 (0)	0 (0)	0 (0)
Urinary	0 (0)	0 (0)	0 (0)

SSI, surgical site infection.

was found. However, administration of steroidal anti-inflammatory drugs was associated with SSI (P=0.028) (table 3).

The type of surgical scrub used by staff and the patient, removal of hair and changes in cell blood count were not related to SSI. In the biochemistry blood work, presurgical hyperglycaemia increased the risk of developing SSI (P=0.015) (table 4).

Table 5 summarises the anaesthetic variables, and no significant relationship was found for any of them (ASA status, hypotension, hypothermia, maintenance anaesthetic agent or locoregional block). The number of people in the operating room, undergraduate students present and staff who performed the intervention did not act as risk factors in this analysis (table 6).

All surgical variables were summarised in table 7. No association was found between the development of SSI and the degree of contamination, presence of drains,

2	3 (7.1)	39 (92.9)	1.5	0.4 to 6.4	0.679
3	6 (10.5)	51 (89.5)	1	0.2 to 4.3	1
Students					
No	7 (9.7)	65 (90.3)	1		–
Yes	7 (10.4)	60 (89.6)	1.1	0.4 to 2.9	0.887
People, n*	9.7 (2.9)	9.8 (3.7)	0.1	–1.9 to 1.8	0.296

*Data are expressed as mean (sd) and mean difference.
RR, risk ratio.

that developed SSI (€321.0 higher than non-infected patients, €225.7, which means an increment of 142.2 per cent). When postsurgical costs were analysed according to the type of SSI, the mean cost of superficial SSI was found to be €452.4, deep SSI €852.4 and organ/space SSI €1160.

DISCUSSION

The SSI incidence obtained in this study was greater than the incidence estimated by previous studies (3.0–6.6 per cent),[4 8 9 11] and this may be due to several reasons. First of all, the current study reported a higher proportion of contaminated and dirty surgical procedures compared with other previously published studies. In addition, the surveillance system used may also be responsible for the differences detected. In fact, the current study used standardised and up-to-date definitions[12] and that probably allowed a better detection of infections. On the other hand, all patients were checked up at the hospital by qualified personnel, which could also determine a better detection rate. In fact, an underestimation of SSI in primary care centres without specialised personnel has been described in human medicine.[9] Given these differences, it is important to emphasise that patients need to be checked up by qualified personnel. Additionally, where this check-up may not be performed by qualified personnel, awareness should be raised in primary care centres about the importance of SSI and the need to refer these patients to more sophisticated facilities.

In human medicine, the SSI is the most common of all nosocomial infections (16.0 per cent of total infections)[12] being its overall incidence of 5.0 per cent.[13] In the region where this study was performed, the data published in 2012 by the surveillance system of healthcare-associated infections reported an incidence of 3.9 per cent.[14] However, the incidence obtained in studies conducted in the country where the study was performed in the 1990s during the early stages of implementation of

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Despite the small number of studies and the early stages of implementation of SSI surveillance systems in veterinary medicine, the hypothesis of this study was that the incidence of SSI would be higher than that estimated in human medicine and that the risk factors associated with SSI would be similar to those existing in human medicine.

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operative antibiotics in clean procedures is not contemplated. In fact, a number of studies have concluded that the continuation of this treatment more than 24 hours postoperatively provides no benefit against the development of SSI and may even contribute to the occurrence of antimicrobial resistance.[39–43]

No association was found between the placement of neither urinary catheter nor feeding tube with the development of SSI. However, when urinary catheterisation was analysed separately it proved to be a risk factor in the development of SSI. This finding has not been discussed previously in veterinary medicine. However, it could be explained by the proven association between the development of urinary tract infections (UTI) and the placement of urinary catheters.[44] In fact, the microorganisms responsible for the development of UTIs could easily be involved in the colonisation of surgical wounds.

Regarding the use of Elizabethan collar, an association was found between the lack of its use and the development of SSI. This phenomenon could be explained by the existence of certain degree of self-mutilation in veterinary patients when the healing surgical wound is not protected. As a result, the oral bacteria present in the mouth of dogs would directly contact the surgical site leading to the development of SSI. Many textbooks recommend the use of Elizabethan collar in the early postoperative period until the surgical wound is completely healed.[45 46] However, no previous published study had proven this relationship.

An added value of this study to veterinary medicine is the estimated economic impact of SSI that had only been previously evaluated by one single study.[47] In fact, the current study showed that the development of SSI occurred in organ/space infections due to the therapeutic requirements of this type of infection which are much more invasive and expensive. Therefore, avoiding surgical infections is vital to preserve the patient's overall health status and to avoid unnecessary expenses. In fact, the implementation of surveillance and control systems for SSIs could reduce the economic costs and improve the service offered to patient and owner.

In summary, the implementation of SSI surveillance systems is necessary for the detection of its incidence as well as of the risk factors associated with its development. They would provide information that would allow the implementation of prevention and control measures that would help reduce infection rates and associated costs.

Acknowledgements We acknowledge the support from Fundación Universidad Alfonso X el Sabio – Santander Universidades.The authors thank the Small Animal Surgery and Anesthesia services, especially Dr. Raúl López-Gallifa, for their assistance in data collection. They also appreciate the support of Dr. Tania Ayllón Santiago and her contributions during the final review of the manuscript.

Contributors JE-R designed data collection tools, monitored data collection for the whole trial, wrote the statistical analysis plan, cleaned and analysed the data, and drafted and revised the paper and he gave final approval of the version to be published MDM-R analysed the data, cleaned and analysed the data, and drafted and revised the paper and she gave final approval of the version to be published VS designed data collection tools, analysed the data and drafted and revised the paper and she gave final approval of the version to be published MRB designed data collection tools, monitored data collection for the whole trial, and revised the draft paper and she gave final approval of the version to be published GO-D wrote the statistical analysis plan, monitored data collection for the whole trial, and revised the draft paper and he gave final approval of the version to be published. He is guarantor.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article.

Jorge Espinel-Ruperez http://orcid.org/0000-0003-3170-9300

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Delovi rada – koja se vremena koriste (gramatika)

- Naslov – sadašnje vreme
- Apstrakt – prošlo i sadašnje vreme
- Uvod / prošlo i sadašnje vreme
- Materijal i metode / prošlo vreme
- Rezultati / prošlo vreme i ponekad sadašnje
- Diskusija / prošlo, sadašnje i ponekad buduće
- Zahvalnica / Acknowledgment
- Literatura / Reference

Biomaterials. **Crossing kingdoms: Using decellularized plants as perfusable tissue engineering scaffolds.**
Gershlak i sar., 2017

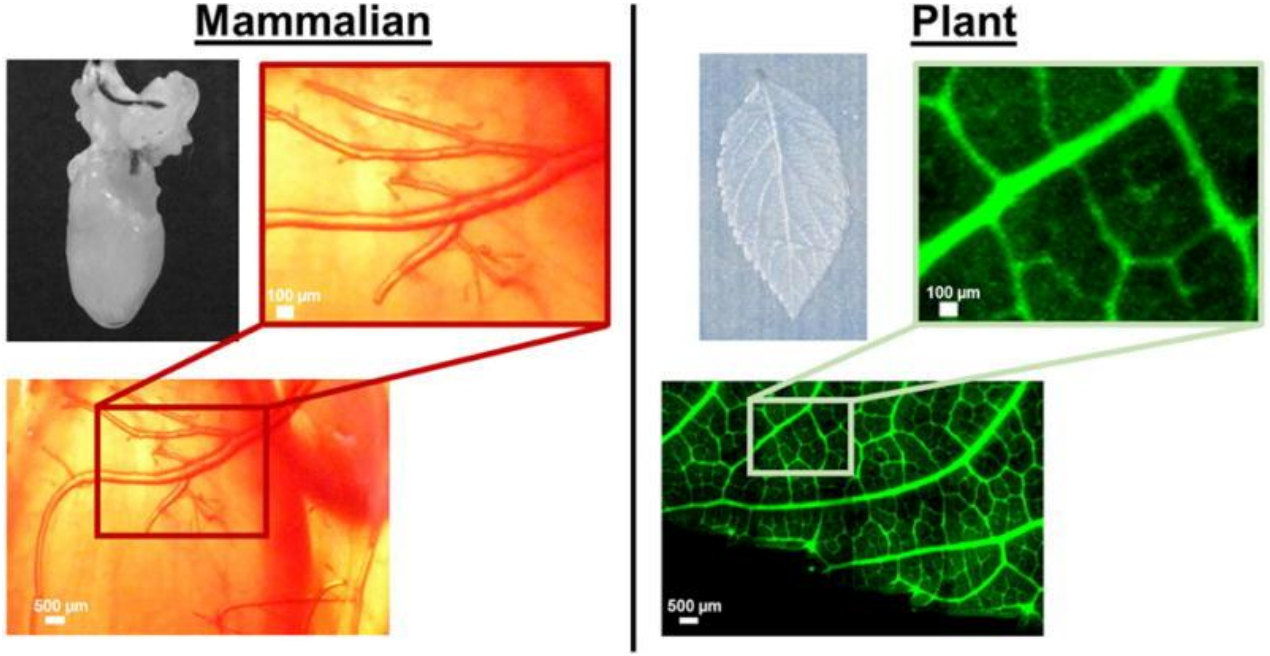


Figure 1. Comparison of animal and plant vascular network pattern branching and structuresA rat heart was decellularized, as previously described [6], and was perfused with a Ponceau Red stain to visualize the vasculature. A *Buddleja davidii* leaf was perfused with fluorescein-labeled PEGDA to visualize the leaf vasculature.

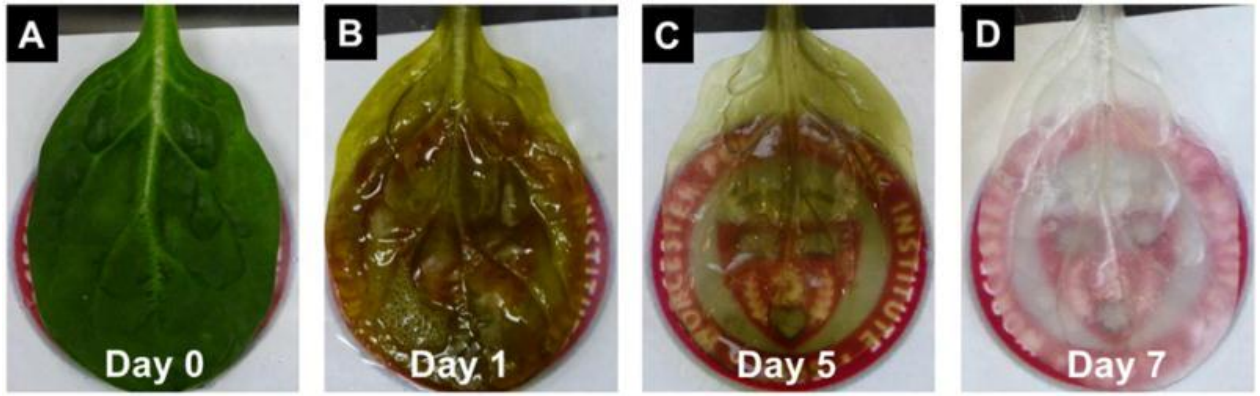


Figure 2. Time lapse of spinach leaf decellularization(A) Leaf is dark green and opaque prior to decellularization at Day 0. **(B)** At Day 1, the leaf loses some of its dark coloring and begins to appear translucent. **(C)** By Day 5, the leaf is completely translucent while maintaining a light green hue. **(D)** After being treated and sterilized with sodium chlorite, the leaf loses the remainder of its coloring and becomes completely decellularized on Day 7.

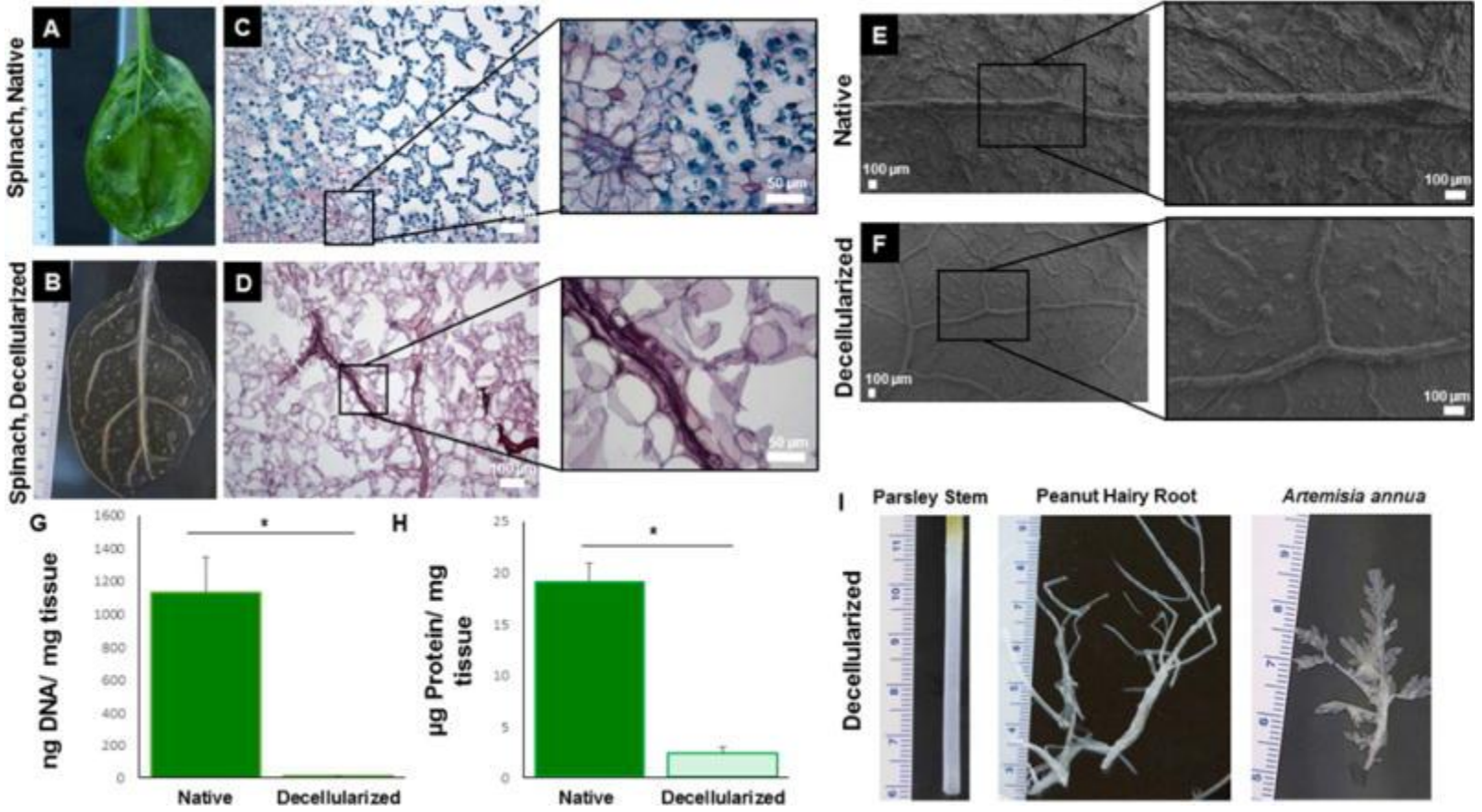


Figure 3. Characterization of plant scaffolds before and after decellularization Spinach leaf **(A)** before and **(B)** after decellularization; **(C)** Native and **(D)** decellularized leaf stained with Safranin and Fast Green. Safranin-O (red) stains for chromosomes and nuclei. Fast Green (bluish-green) stains for cytoplasm and cellulosic cell walls. The blue dark spheres are indicative of chloroplasts, which are highly abundant in leaves. Scale bars: 250 µm and 50 µm (insert). Scanning Electron Microscope image of surface topography for both **(E)** native and **(F)** decellularized spinach leaves with inserts showing higher magnification. Scale bars: 100 µm. **(G)** DNA content was quantified through a CyQuant assay (p=0.00002; n=4). **(H)** Total protein before and after leaf decellularization was quantified by Bradford assay (p=0.0000007; n=3). **(I)** Decellularization process was applied to other plant types and structures.

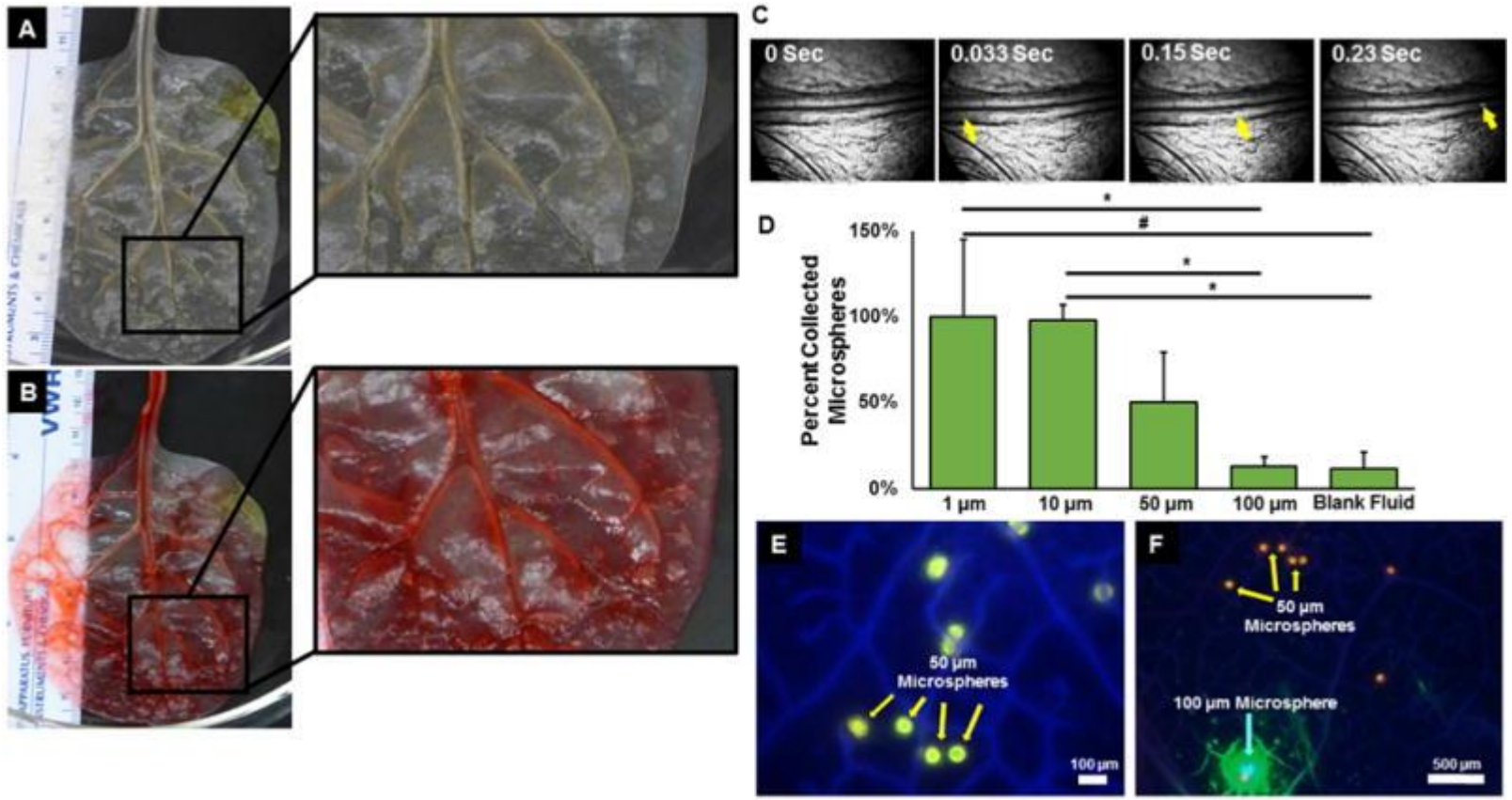


Figure 4. Spinach leaf vascular scaffolds retain patency and perfusion capabilities after decellularization Decellularized leaf **(A)** before and **(B)** after perfusion of Ponceau Red. Fluorescent microspheres of various diameters (1, 10, 50, and 100 µm) and blank fluid were perfused through a decellularized leaf. Statistical differences were found between the percentage collected between both 1 and 10 µm and the collection of 100 µm and blank fluid. (* indicates $p<0.05$, # indicated $p<0.01$). **(C)** Video frames capturing microsphere location within a leaf vein over time, with the arrow tracking an individual microsphere. **(D)** Microspheres that traversed vascular walls were collected and their fluorescence quantified (n=3). **(E, F)** Fluorescence images of leaf vasculature perfused with beads. Images show 50 and 100 µm spheres retained within the vasculature. Scale Bars: 100 µm (E), 500 µm (F).

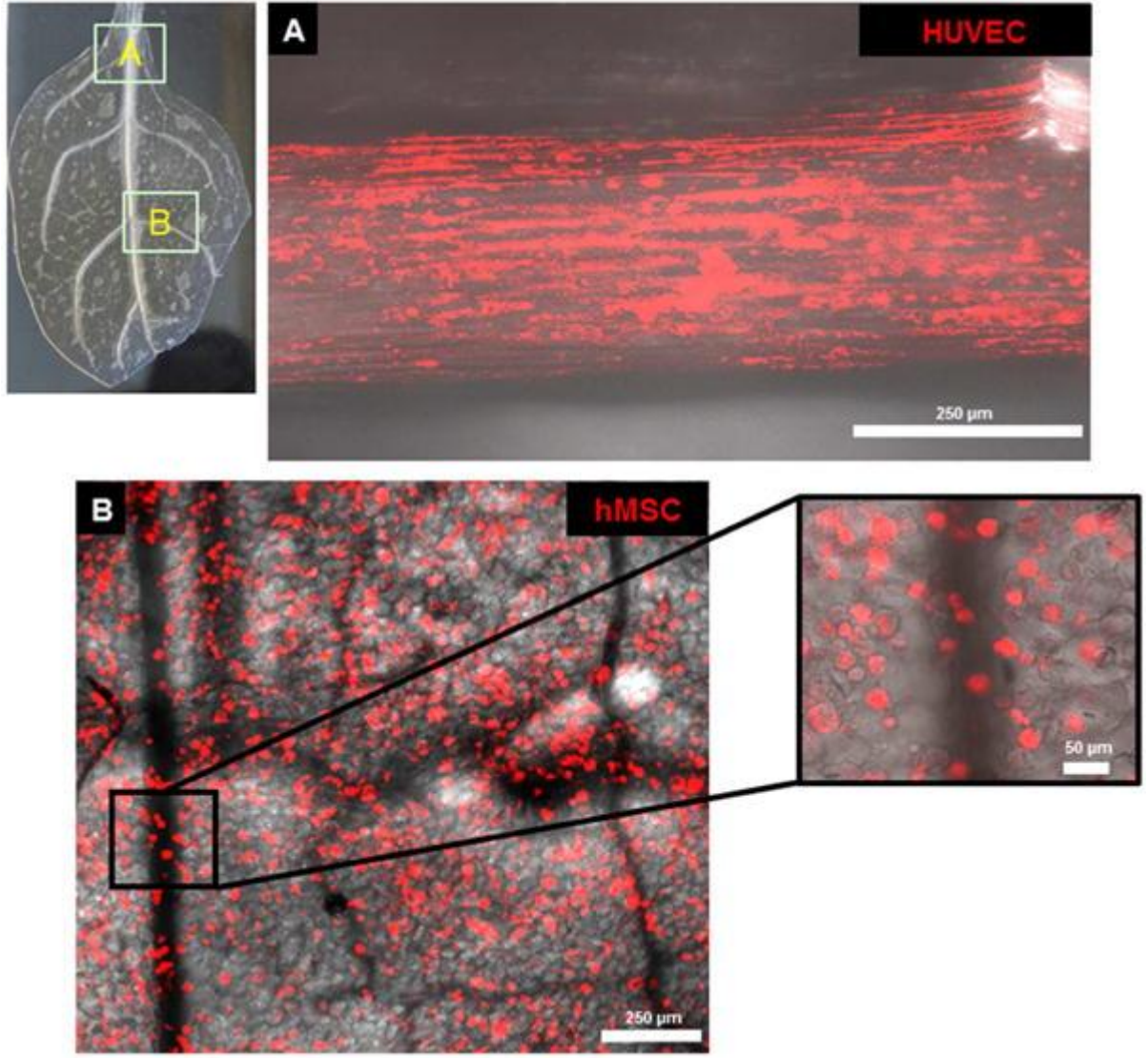


Figure 5. Human cells can be used to recellularize the decellularized spinach leaves The image of the leaf in the upper left corner of the image gives the relative position from which images A and B are derived. **(A)** Dil-Ac-LDL-labeled human umbilical vein endothelial cells (HUVECs) were seeded within a vein of a decellularized spinach leaf by perfusion. Scale bar: 250 µm. **(B)** Human mesenchymal stem cells (hMSCs) were labeled with quantum dots and seeded onto the surface of a decellularized spinach leaf. Scale bars: 250 µm for main image, and 50 µm for insert.

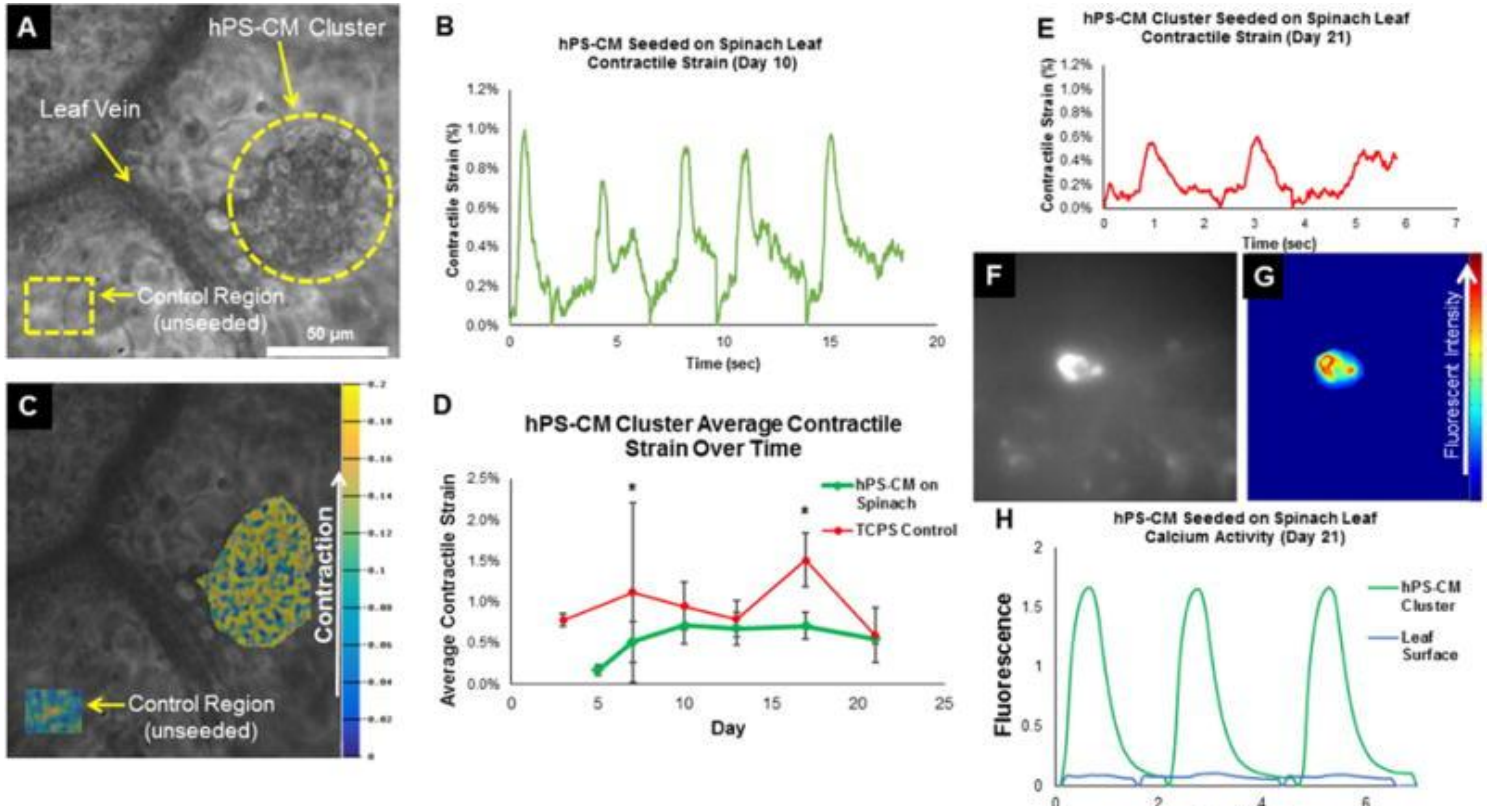
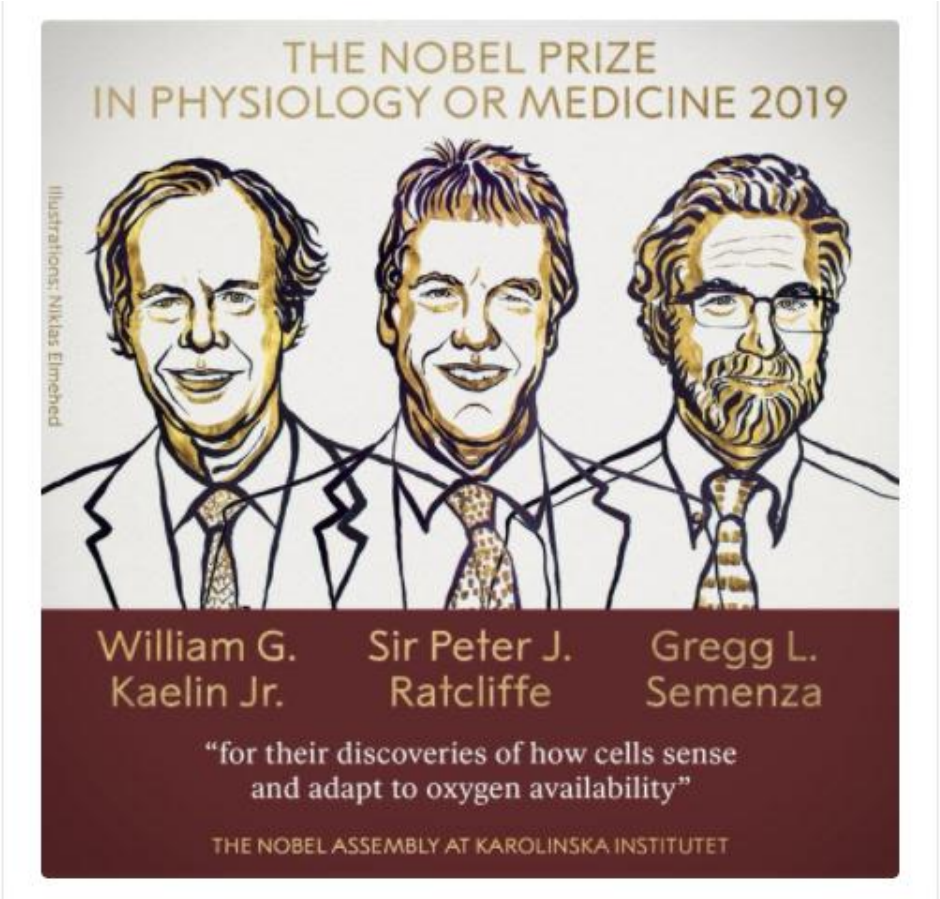
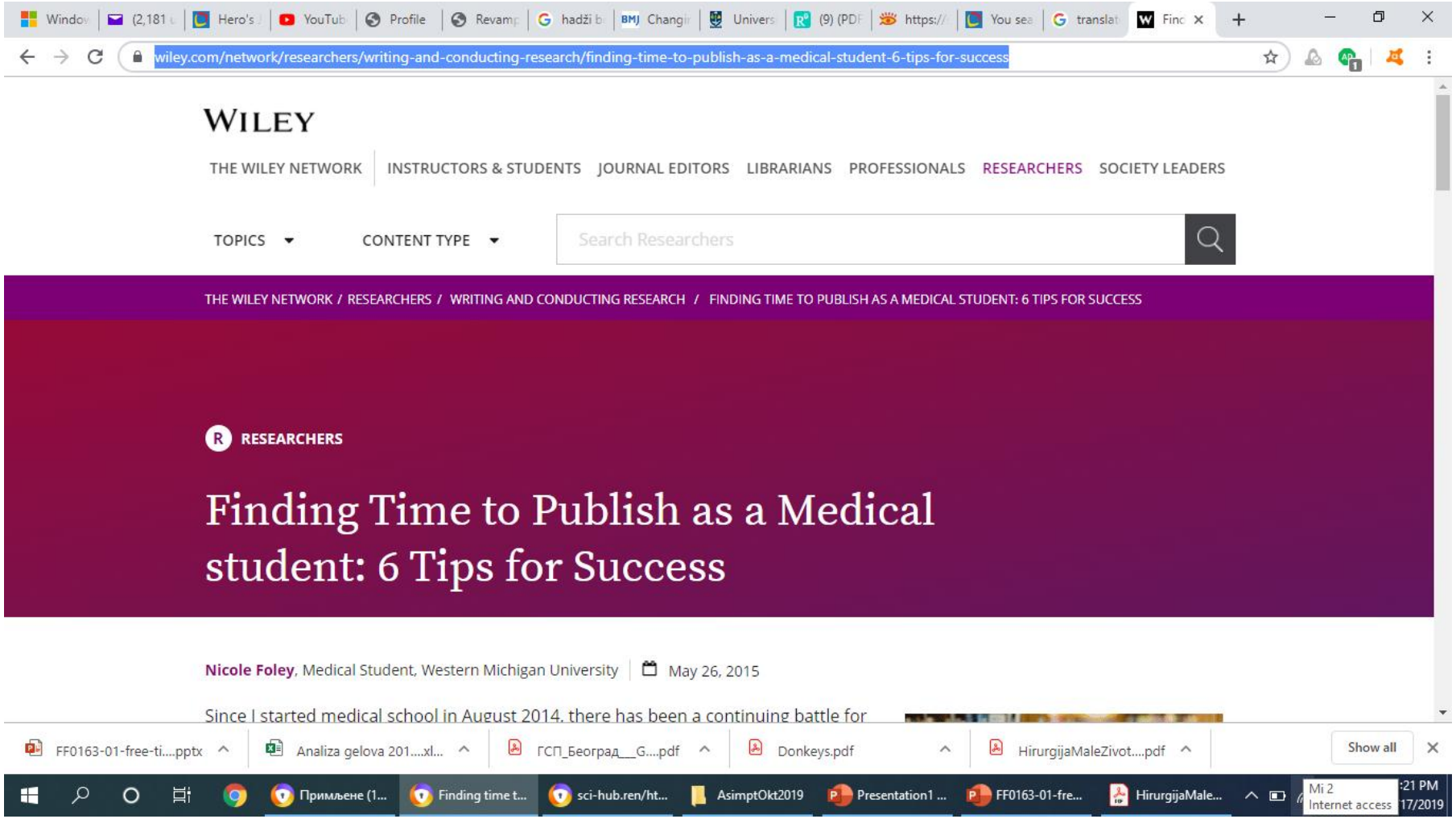


Figure 6. Human pluripotent stem cell-derived cardiomyocytes (hPS-CMs) adhere and function on the surface of a leaf scaffold for 21 days(A) hPS-CMs adhere and form cell clusters. Scale bar: 50 µm. **(B)** Contractile strain of hPS-CMs was quantified through subpixel level displacement of the cell clusters. Contraction was graphed over the time of recorded videos and, on Day 10, the cluster was found to contract at nearly 1% strain. **(C)** Contractile strain can be visualized through a heatmap. **(D)** Contractile strain was measured over 21 days for a cluster of cells. Contractile strain was compared to a control of hPS-CMs cultured on tissue culture plastic (TCPS). Strains calculated on days 7 and 17 were found to be statistically greater on cells seeded on the TCPS as opposed to cells seeded on the leaf scaffolds (* indicates $p<0.05$). There were no statistical differences calculated in any of the other time points. **(E)** Day 21 strain values showing the lowered contractile strain magnitude. **(F)** hPS-CMs were modified with a GCaMP3 reporter [30], providing a fluorescent signal corresponding to the intracellular flux of calcium ions. **(G, H)** The relative change of fluorescent signal was visualized and compared relative to the leaf surface on Day 21.

A kada su počeli?



https://www.wiley.com/network/researchers/writing-and-conducting-research/finding-time-to-publish-as-a-medical-student-6-tips-for-success



https://www.vettimes.co.uk/news/first-winners-of-veterinary-evidence-student-awards-announced/

Three students from vet schools in Edinburgh and Cambridge have become the first winners of the RCVS Knowledge *Veterinary Evidence* Student Awards.

The awards are open to all undergraduates studying veterinary medicine, veterinary nursing or bioveterinary science.

Winners

The inaugural winners were:

- **First prize – Molly Vasanthakumar from The University of Edinburgh** for her knowledge summary comparing the ecological impact of woven versus disposable drapes.
- **Second prize – Honoria Brown from the University of Cambridge** for her work on whether hoof wall temperature and digital pulse pressure can be used as sensitive, non-invasive diagnostic indicators of acute laminitis onset.
- **Third prize – Jacqueline Oi Ping Tong from The University of Edinburgh** for her critical appraisal of the evidence for whether a daily probiotic improved clinical outcomes in dogs with idiopathic diarrhoea.

Second prize winner Honoria Brown.

Published papers

First prize winner Ms Vasanthakumar received her award at Royal College Day on 12 July, while the second and third place prize winners were notified separately.

All three had papers published in *Veterinary Evidence*, the RCVS Knowledge peer-reviewed journal.

The awards were launched last year to engage veterinary students in evidence-based veterinary medicine and recognise high-quality undergraduate research.

https://www.vmdtoday.com/news/meet-the-2018-veterinary-student-innovation-award-winners

Merck Animal Health recently announced the winners of the 2018 Veterinary Student Innovation Awards.

The inaugural award was created to recognize graduating seniors at each American Veterinary Medical Association —accredited veterinary school in the United States and Canada. The student winners demonstrated innovation, entrepreneurship and creativity in developing an inspirational project or product. The awards were presented in partnership with the American Veterinary Medical Foundation (AVMF).

Carolyn Benedetto, (left) a 2018 award recipient with Christy Kebodeaux of Merck Animal Health.

RELATED:

- **Diversity, Inclusion Lacking on Veterinary College Campuses**
- **Zoetis Program Awards 315 Veterinary Students With Scholarships**

"We are pleased to recognize and support these outstanding veterinary students," said Jan K. Strother, DVM, chair of the AVMF board of directors. "Not only have these students displayed entrepreneurial spirit, initiative and creativity, but they are also making a positive difference in their communities and in our veterinary profession."

Examples of projects developed by recipients include:

- Vets for Vets, which provides rehabilitation for retired military and police dogs.

High Educ (2019) 77:403–421
https://doi.org/10.1007/s10734-018-0275-9

A study exploring the impact of lecture capture availability and lecture capture usage on student attendance and attainment

Martin R. Edwards[1] · Michael E. Clinton[1]

Published online: 5 June 2018

Abstract Lecture capture is widely used within higher education as a means of recording lecture material for online student viewing. However, there is some uncertainty around whether this is a uniformly positive development for students. The current study examines the impact of lecture capture introduction and usage in a compulsory second year research methods module in a undergraduate BSc degree. Data collected from a matched cohort before

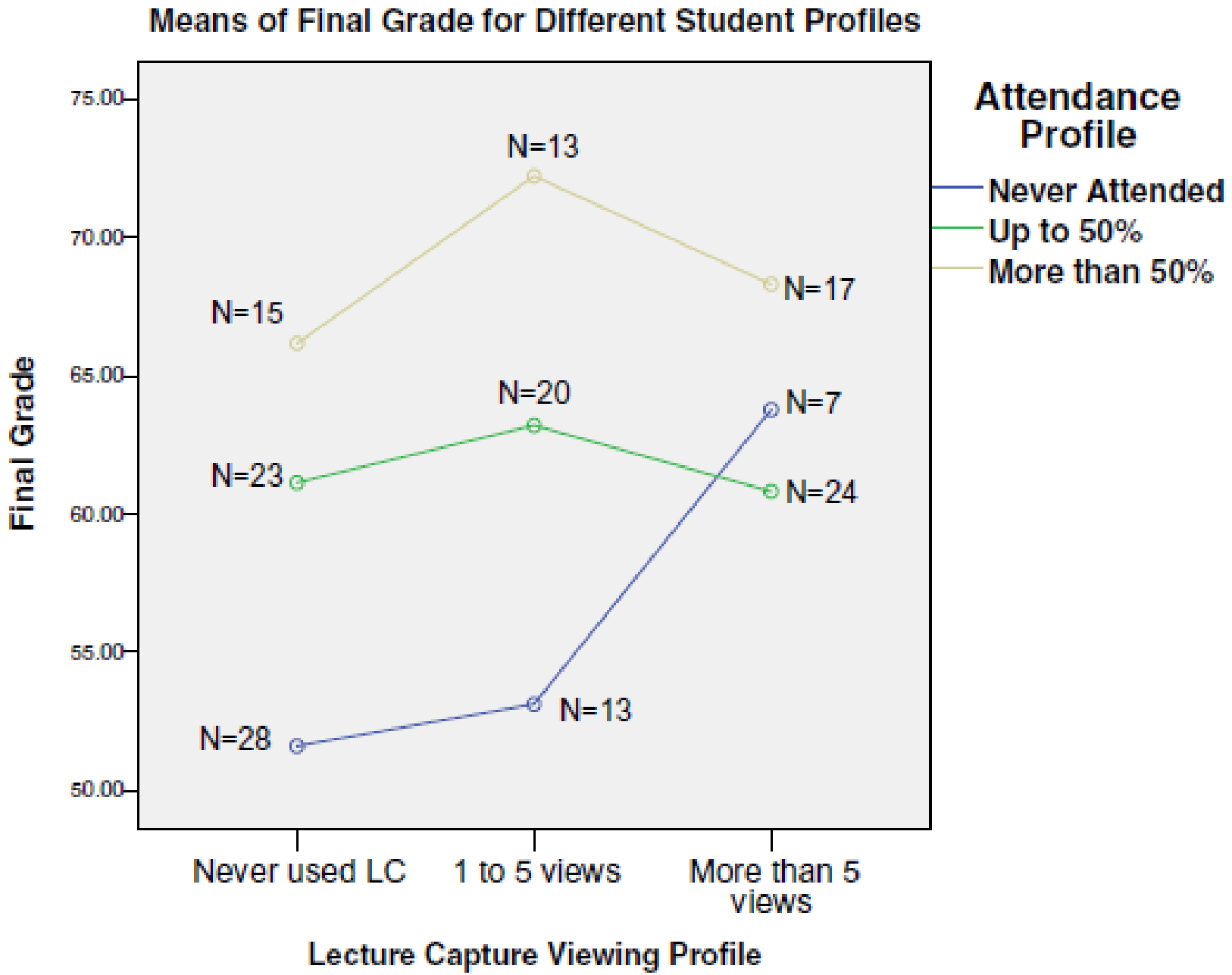


Fig. 3 Final grade associated with student profiles of attendance and lecture capture usage

Dobro se zabavljajte!