



ARE MEDICAL UNIVERSITY STUDENTS AWARE OF PROBIOTICS?



Piotr Kochan^{a,b}, Strus Magdalena^{a,b}, Piotr B. Heczko^{a,b}

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BACKGROUND AND AIM:

Is the definition of probiotics, despite being known for so many years, understood? And what are the routes that probiotics may be administered in? May they be administered intravenously to pregnant women? We decided to verify these and other concepts related to the knowledge of probiotics on the students of the medical school in Cracow, which turned out to be a very good testing ground.

MATERIALS & METHODS:

A short test consisting of five multiple choice questions was prepared at the Chair of Microbiology Jagiellonian University Medical College in Cracow in cooperation with the Polish Society for Probiotics and Prebiotics and used on random voluntary groups of students. The tested groups consisted of Polish medical (V year, n=294; III year, n=230), dentistry (II year, n=124), nursing (n=146) and lab diagnostics (n=10) students as well as students from the School of Medicine in English (II year 4-year* course, n=34; III year 6-year** course, n=99; V year 6-year course, n=23). Only one answer was correct in each question and the study group consisted of 960 students. The students answered to all questions in exam settings and the answers were marked twice by 2 different evaluators to ensure correct interpretation of results. Figure 1 shows the questionnaire form.

RESULTS:

The results were totally unexpected. Despite most (78%) knowing the definition of probiotics (Question 1), many students (76%) had problems in distinguishing probiotics from prebiotics (Question 2). On the contrary, most knew that there are World Health Organisation/Food and Agriculture Organisation of the United Nations criteria for evaluation of probiotics (n=703/960, 73%). Unfortunately when it comes to administration of probiotics in humans, the results were disastrous, as seen in Questions 4 and 5. In Question 4 the majority of Medical University students selected incorrect answers, including intravenous or intrathecal routes (n=509/960, 53%)!!! Results of Question 5 were especially shocking and may point to the "gap" that is used by some companies which try to use attractive species designations. The real tricks in that question were fake species as well as administration of probiotics i.v. to pregnant women – the important detail that many tested students missed or simply ignored. The results to that question are shown in a pie chart (Figure 2). There were no special differences between the different student groups, with the exception of V-year medical students who did slightly better in correlating the definition of probiotics with the route of administration, but still most selected incorrect answers.

CONCLUSIONS:

This short study shows significant need for improvement of the basic knowledge in the field of probiotics of students of the medical university, whether Polish or English speaking (1st or 2nd language). Even though probiotics are advertised widely in the media nowadays, the "routine" knowledge is vague. This study also proves that knowing the definition is not always parallel with understanding it. To conclude probiotic societies and universities should make efforts to fill this knowledge gap, especially since doctors, nurses, etc., aside of pharmacists and media, are in actual fact the first line of information for the general population.

And of course, mind the gap, the other "gap".

^a Department of Bacteriology, Microbial Ecology and Parasitology, Chair of Microbiology, Jagiellonian University Medical College, 18 Czysa Street, 31-121 Cracow, Poland

^b Polish Society for Probiotics and Prebiotics, 18 Czysa Street, 31-121 Cracow, Poland

Details available on request from Piotr Kochan, M.D.
E-mail: pkochan@cm-uj.krakow.pl
Telephone: +4812 633 25 67
Fax: +4812 423 39 24

* Medical studies for College/University graduates (usually students from Canada and the USA).

** Medical studies for High School graduates (usually students from Scandinavia and other European countries).

Figure 1. Questionnaire used in the study (English version).

ANONYMOUS QUESTIONNAIRE
(Please circle or make an X on the selected answer)

- 1. Probiotics are:**
 - (a) live microorganisms, which when administered in adequate amount confer a health benefit on the host.
 - (b) non-digestible (by the host) food ingredients that have a beneficial effect through their selective metabolism in the intestinal tract.
 - (c) digestible (by the host) food ingredients that have a beneficial effect through their selective metabolism in the intestinal tract.
 - (d) partially-digestible (by the host) food ingredients that have a beneficial effect through their selective metabolism in the intestinal tract.
- 2. Good example of a probiotic is:**
 - (a) inulin, *Lactobacillus* GG
 - (b) inulin, *Lactobacillus rhamnosus*
 - (c) both (a) and (b)
 - (d) none
- 3. When it comes to probiotics the general rule is:**
 - (a) the more you use the stronger the effect, irrespective of the formulation
 - (b) they are generally considered as safe and there is no need for randomized controlled trials
 - (c) they should be evaluated using criteria set forth by the World Health Organization (WHO)/United Nations Food and Agriculture Organization (FAO)
 - (d) both (a) and (b)
- 4. Probiotics in humans may be administered:**
 - (a) orally (*per os*)
 - (b) intrathecaly
 - (c) intravenously (*iv*)
 - (d) all of the above
- 5. Probiotics to be administered intravenously to pregnant women include:**
 - (a) *Lactobacillus ingerens* sub sp. protectiva
 - (b) *Bifidobacterium neonatorum*
 - (c) both (a) and (b)
 - (d) none

Figure 2. Results of Question 5 were totally surprising. The majority of Medical University students, i.e. future doctors, dentists, nurses and lab diagnosticians answered to this question incorrectly (55%). This is interesting since most knew the definition of probiotics which says "live microorganisms".

