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EDUCATION IN IMMUNOLOGY

Title: USE OF CONCEPTUAL MAPS TO ASSESS LEARNING OF IMMUNOLOGY

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Introduction: The teaching of Immunology has to be integrated into the learning of Microbiology, Parasitology and Pathology. In order to stimulate the integration, we used the strategy of tutorial groups and the tool of conceptual map to promote meaningful learning and fixing the knowledge. Using this strategy increases the attention and interest of learners, encourage participation, critical thinking and articulating basic and clinical aspects. Tutorial groups occurred at two meetings of two hours, with an interval of 8 hours between them. The class was divided into three teams 5-6 students and five issues were discussed, covering everyday situations of nurses. The analysis of the problems was followed by a meeting with the monitors, where they performed laboratory practices related to data contained in the problem. At the second meeting, the concept map was prepared by each group in solving the problem, and our goal was to assess whether the strategy of the learning objectives achieved through the scoring of conceptual maps.

Methods and Results: The maps were carefully evaluated by J. Mueller score, from the web page <http://jonathan.mueller.faculty.noctrl.edu/240/conceptmaprubric.htm>. This score has a maximum degree of 20 points, divided into four dimensions: Readable from 0-2 points; correct, 0-5 points; full of 0-5 points and refined 0-8 points. The average of the maps was produced by 15.5 ± 2.88 . Considering the maximum score in the assessment of 20 points, the teams were evaluated as well, reflecting the effectiveness of the strategies used to achieve the learning objectives. There were no significant differences between the mean maps of the three groups (ANOVA), indicating a good uniformity and student achievement.

Conclusions: The maps are great tools for both learning how to assess the achievement of the objectives of the strategy used.

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IMUNOCAST: PODCAST ON IMMUNE COMPONENTS PRESENT IN HUMAN BREAST MILK DEVELOPED BY A MULTIDISCIPLINARY TEAM

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Introduction: Science dissemination is much more than transmit information. It contributes forming citizens. The reduction of superstition and pseudoscience could be achieved, both with the democratization of scientific knowledge, and with greater accessibility to its contents. Podcast and blog were created and published with the aim of bringing scientific knowledge to professionals and academics in the field of biomedical addressing the immune constituents in human breast milk. **Methods and Results:** Nursing and journalism graduation students at the Federal University of Uberlândia were responsible for the production of podcasts and blog posts. Were selected abstracts of scientific articles in English published recently. The abstracts were translated and adapted into Portuguese. Texts related to audio have been available in each blog post. Different adjustments on the texts and audios were used to facilitate listener's comprehension. The podcasts are hosted on the Soundcloud and the Imunocast blog (<http://imunocastufu.blogspot.com.br>), allowing listeners to choose the form of access. The selection of the name "A ciência diz" aimed to facilitate the comprehension of scientific content. A graphic design resembling an antibody with headphones aimed to create an identity for the podcast and blog. All numerical data in the texts were removed, but their information was interpreted and maintained. Abbreviations and acronyms in immunology were, as far as possible, replaced by their meanings. The texts were written respecting the new rules of grammar of the Portuguese language and bibliographical references. Team members of journalism were important not only in editing the podcast and blog, but also for regulating the copyright of all content published, the creation the logos, the favicon and the fanpage on Facebook, mechanisms that facilitated the dissemination of the project. **Conclusion:** Thus, it sought to create a service to promote the democratization of knowledge, adapting the language of science, often complex, and therefore promoting a service related to the disclosure of the importance of human milk in the induction and immune system maintenance.

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PODCASTS FOCUSING IMMUNOLOGICAL CONSTITUENTS PRESENT IN HUMAN BREAST MILK

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Introduction: The association between digital mobile telephony and Internet predicts major changes in human institutional relations, including education. Aiming to promote content on the role of immune system components present in human breast milk, for academics and for professionals of the biomedical area and encourage them to access articles published in this area, a multidisciplinary group of students and teachers created podcast episodes. Podcast is a media file that can be transmitted over the Internet and accessed for download on mobile devices or not, such as phones, tablets and mp3 players. **Methods and Results:** Nursing and journalism graduation students at the Federal University of Uberlândia were responsible, weekly, both for the production of podcasts and blog posts. Analysis of voice quality, made with all team members, assisted in the choice of host. Vignettes were made with music available in the public domain. A graphic design resembling an antibody with headphones aimed to create an identity for the podcast. Notification of new posts via RSS was provided. Two series of podcasts were hosted on SoundCloud and on the Imunocast blog (<http://imunocastufu.blogspot.com.br/>): (1) "Imunologia de berço" was created as a resource to support teaching in classes for the undergraduate program in nursing and (2) "A ciência diz" was focused at professionals and students in the area of biomedical sciences. Files in pdf format, containing the audio transcriptions, have been available in each blog post. Abbreviations and acronyms in immunology were, as far as possible, replaced by their meanings. The texts were written respecting the new rules of grammar of the Portuguese language and bibliographical references. A fanpage on Facebook was created to promote the project. In the first month, five episodes were published on the blog and had over 700 views. In August 2012, all project members participated in the fourteenth week of breastfeeding in the UFU for divulging the blog and podcast. **Conclusion:** Technical details in the preparation of audio, text and blog were built to facilitate the understanding of content by listeners/readers and were important to making them accessible and understandable, especially for professionals in the areas of biomedical sciences.



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TEACHING OF IMMUNOLOGY: MAJOR METHODS AND RESOURCES USED IN BRAZILIAN UNIVERSITIES

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Introduction and Objectives: Immunology, a science with dynamic content and rich in detail, contributes to the formation of many professionals in the health area (Nat. Immunol. 5:893-898). The aim of this study was to analyze the main didactic features and methodological characteristics of the teaching of Immunology. The research was based on the content analysis of questionnaires administered to ten teachers of different universities. **Results:** The workload of the discipline of immunology ranges from 60 to 90 hours, which is considered inadequate for working all the content in the immunology set menu by 60% of the interviewed teachers. This has often resulted in difficulty in approaching the content in more detail and insufficient time for conduction of experimental lessons. Teachers pointed out that the main factors that hinder the teaching of immunology are the little contact that students have with the school and deficient prior knowledge of molecular biology, biochemistry, and physiology. These problems reflect the difficulty that students have in understanding contents such as complement system, genetic expression and recombination, major histocompatibility complex, and lymphocytes maturation and activation. On the basis of these difficulties, 70% of the university professors used teaching tools such as reading of scientific articles and handouts, seminar presentations, group dynamics, guided study, and interactive activities in the Moodle platform to stimulate learning. Teachers reported that students are more interested in content such as innate and acquired immune response, hypersensitivity and autoimmune diseases, tumor immunology, and immunotherapy. **Conclusion:** This study contributes to supplying knowledge in the teaching field of immunology in Brazil and aids proposals for future models and instructional technology applications in immunology.

EXERCISE IMMUNOLOGY: AN ESSENTIAL SUBJECT TO BE ADDED INTO THE CURRICULUM OF BRAZILIAN PHYSICAL EDUCATION STUDENTS.

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Introduction: Exercise immunology is a new branch of immunology since the 80s and it has shown its importance to better understand the benefits of the regular physical exercise to the society. From the beginning, changes in the curriculum of Brazilian Physical Education (PE) have been influenced by social, political and economical aspects. Chronic inflammation appears mainly in non-active and overweight people leading them to diseases, as type 2 diabetes mellitus and different types of cancer. Moreover, regular physical exercise has shown strong evidences in prevention and treatment of these diseases, rather than amortizing the economic burden of these diseases (e.g.: decreasing the use of medication and hospitalization). Immunologically, exercise practice are responsible for the reduction of inflammation, such as increasing the complement factor H and decrease of the factor B, and improvement in innate and adaptive immune response, such making dendritic cells more mature by increasing MHC-II expression and IL-12 production and releasing and macrophage regulation. **Methods and Results:** In the present study, we proposed to search the existence of immunology from active undergraduate curriculums from all Brazilian institutions. From 1,103 analyzed curriculums, we found 695 that completed the criteria of full curriculums, but only four of them (0.6%) were found to have Immunology subject in their curriculums. ('Physical activity and immunological system'; 'Pathology, immunology and parasitology'; and 'Immunology and pathology of nontransmissible diseases'). **Conclusion:** Considering that exercise Immunology is nowadays vital to provide better understanding of people's health to the physical educator, it is essential to insert this matter as regular subject in the curriculums of physical education undergraduate courses. Also,



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it will be necessary to improve informative activities specially to the bachelor physical educators, as their responsibilities will make possible to provide curriculum changes 'today' will be crucial to help the students to be better professionals 'tomorrow'.

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