

To

The chairman of the scientific jury,
determined by Order № RD-09-10, 10.03.21.
of the Director of IEMPAM, BAS

Attached I present: Review
in a competition for the academic position of "Associate Professor"
in the scientific specialty "Morphology"
announced for the needs of IEMPAM-BAS, section "Experimental morphology"
in SG, no. 16 / 23.2.2021

Reviewer: Prof. Krassimira Todorova-Hayrabedyan, Ph.D., DSc
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The review is compiled in accordance with the requirements of ZRASRB and Section III /
Section IV of PPRASRB - Conditions and procedure for holding the academic position of
"Associate Professor" / "Professor"

БЪЛГАРСКА АКАДЕМИЯ НА НАУКИТЕ
И-Т ПО ЕКСПЕРИМЕНТАЛНА МОРФОЛОГИЯ,
ПАТОЛОГИЯ И АНТРОПОЛОГИЯ С МУЗЕЙ
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СОФИЯ

REVIEW

in a competition for the Academic position of "Associate Professor" in the professional field 4.3. Biological Sciences, Scientific specialty: "Morphology", announced in the State Gazette, issue 16 / 23.2.2021, for the needs of Section "Experimental Morphology", IEMPAM - BAS

by Prof. Krassimira Todorova-Hayrabedyan, Ph.D., DSc
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I. Analysis of the candidate's career profile.

Assistant Professor Ekaterina Hristova Pavlova is the only candidate in the competition. She has completed a master's program in "Cell Biology and Pathology" at the Biology Faculty at Sofia University "St. Kliment Ohridski" in 2004. In the same year she started working as a biologist-specialist at the Institute of Experimental Morphology, Pathology and Anthropology with a museum, BAS. In 2011 has taken the academic position of "assistant" in the section "Experimental morphology", at IEMPAM, BAS. After defending a dissertation on the topic: "Morpho-functional characteristics of estrogenic effects on spermatogenesis in mammals", in 2014. Ekaterina Pavlova has held the academic position of "Chief Assistant" in the same section.

II. General description of the submitted materials in the competition.

The materials presented in the competition are well arranged and reflect the requirements of the Law and the Regulations for the implementation of the law for the development of the academic staff in the Republic of Bulgaria, as the materials are presented in both paper and electronic media. The overall history and production of Assistant Professor E. Pavlova, both through a CV, lists of publications and citations, and through the submitted scientific contributions, and a reference-declaration for implementation of minimum national requirements and the requirements of BAS for participation in a competition for "Associate Professor", in area 4 Natural sciences, mathematics and informatics Professional field 4.3. Biological sciences. The presented data show, according to a preliminary assessment, coverage of the minimum scientometric and other criteria of LDACRB and RILDACRB, as well as of the Rules of BAS for development of the academic staff, which allows subsequent detailed evaluation of the application.

III. Evaluation of the candidate's scientific works for the overall academic development.

□ General characteristics of the scientific production and publication activity;

For participation in the competition are presented 1 abstract of a dissertation and 18 scientific articles, all published in English, 17 of which have an impact factor or rank. Of the peer-reviewed and peer-reviewed publications, 7 are in journals with rank Q1, 6 are with rank Q2, 2 are with rank Q3 and 2 are with rank Q4. The publications are in a number of prestigious journals such as Life Sciences, Chemico-Biological Interactions, Endocrinology and others. The total impact factor of the candidate from articles is: 43.708. Abstracts are presented in prestigious journals also with an impact factor.

□ Scientific activity - dissemination and application of the scientific and practical achievements of the candidate among the scientific community

The scientific production is very good and is well reflected in the scientific community through citations and through its presentation in a number of scientific forums. Data for participation in 113 scientific forums in the country and abroad are presented, with oral reports and posters. Data are presented for 34 citations from 19 literature sources, in which Dr. Pavlova is the author. In the analytical tools of the information system Scopus Chief Assist. E. Pavlova is evaluated with h-index 5.

The high scientific activity of Dr. E. Pavlova in the last 4 years is emphasized, which is demonstrated by the publication of almost half of the articles with which she applied for the competition. Also these articles are with Q1.

Assistant Professor E. Pavlova is also very successful in the field of project financing, having participated in a total of 11 projects, mainly funded by the NSF and BAS. She has been the leader of 2 research projects. One project is funded by the Research Fund for the period 2018-2020. Some of the projects are related to European Framework Programs.

Dr. E. Pavlova has participated in Specialized courses:

1. "Endocrine Disrupters: Effects on Human Reproduction" – a PhD student training course, organized by University of Copenhagen, Copenhagen Graduate School of Health Sciences, May, 2009.
2. Participation in all training modules of the three projects under the Operational Program "Human Resources Development".

She is actively involved in the organization of the VII National Conference with international participation "Morphological Days", June 8-10, 2018, Sofia.

She is a member of many scientific societies: Bulgarian Anatomical Society (BAD); Network for Young Researchers in Andrology (NYRA); International Society of Andrology (ISA); International Federation of Associations of Anatomists (IFAA); European Federation of Experimental Morphology (EFEM)

Assistant Professor E. Pavlova is a winner of 2 awards:

1. Travel grant -International Workshop Molecular Andrology, May 2009, Giessen, Germany.
2. International Coordination Committee for Immunology of Reproduction - Professor Hans Donat award for best posters of young participants, 5th International Symposium for immunology of reproduction, Varna, 2018.

Dr. E. Pavlova has been an expert in the last two years:

1. Review of article, Anonymous, Acta Morphologica et Anthropologica 27 (3-4), 2020
2. Project review, Anonymous, Student Institute of BAS, 2020
3. Project review, Anonymous, Research Fund of Sofia University "St. Kliment Ohridski ", 2021
4. Review of article, Anonymous, Acta Morphologica et Anthropologica 28 (1-2), 2021

Scientific and creative achievements (scientific authority);

The developments of Assistant Professor E. Pavlova are in 3 major thematic areas, and in each area there are several areas in which Dr. E. Pavlova has contributions.

The use of modern methods related to *in vivo* models and *knockout* models for the study of hormonal imbalance, the study of the influence of substances used in the pharmaceutical industry, heavy metals and others is very impressive. Pathomorphological and biochemical changes in the testis and in the reproductive capacity due to intoxication with metal salts and application of antidotes were monitored.

Morpho-functional aspects of spermatogenesis in mammals have been studied and investigated, and identification of biomarkers for hormonal and metabolic disorders has been sought.

1. The functional relationship between the three cell populations in the testis - Sertoli, Leydig and germ cells was analyzed. By administering ethane dimethanesulfonate and selectively killing Leydig cells, testosterone deficiency was monitored, coinciding with the loss of androgen receptor (AP) in Sertoli cells. This is accompanied by increased apoptosis of the germ cells and their depletion of the seminal epithelium. After restoration of spermatogenesis, despite lower testosterone levels, the compensatory mechanism is the re-expression of AP in Sertoli cells to the maximum extent in all stages of the spermatogenic cycle, which is different from the normal stage-specific model. These changes demonstrate the close functional relationship between the three testicular cell populations.

2. Metabolic disorders (diabetes) as a risk factor for male infertility have been studied. Hyperglycaemia (streptozotocin) in prepubertal experimental animals has been shown to affect

Leydig cell counts and testosterone production, which is accompanied by decreased germ cell counts. The duration of the diet leads to overweight and a reduction in testosterone levels and the number of Leydig cells.

3. The role of tAKE as a marker for stage-specific changes in spermiogenesis (spermat elongation) has been studied.
4. The effect of N, N-Dimethylacetamide (DMA) in spermatids in experimental rats was established. It has been found that at the appropriate dose, DMA can serve as a contraceptive.
5. In mouse models, the intracellular signaling mechanisms of action of insulin-like growth factors (IGFs) in the testis, which are a major regulator of Sertoli cell proliferation in the fetal period and sperm production in adulthood, were studied. IGFs secreted by the fetal testis have been shown to act paracrinely by stimulating the proliferation of immature Sertoli cells and sperm production by activating the IGF / PTEN / PI3K signaling pathway.
6. The effect of sodium and heavy metal salts (cobalt, lead and cadmium) on spermatogenesis and reproductive capacity has been established in in vivo experimental models. The role of hypoxia-inducing ions (cobalt and sodium), cadmium (endocrine disruptor) and lead on mammalian spermatogenesis was investigated, and the effect of oxygen deficiency on the testis and reproductive capacity was clarified.
7. The effect of lead and cadmium ions and their chelating agents (monensin, salinomycin and deferiprone) as antidotes for heavy metal intoxications in the testis, as a potential possibility for use as antidotes against heavy metal intoxications, has been studied.
8. Studies in the field of functional neuromorphology have been performed, monitoring the expression of the angiotensin II receptor, type 1 (AT1 receptor) in the limbic structures of the brain, as well as the effect of losartan (AT1 receptor antagonist) in a model of comorbid hypertension and rat epilepsy. It has been found that AT1 receptor antagonists can be used as a therapeutic strategy for the treatment of comorbid hypertension and epilepsy.
9. The influence of environmental factors in mouse models during pregnancy and the early neonatal period was monitored by inducing hypoxia with cobalt salt. A change in the expression of proteins associated with iron metabolism, structural changes in the brain and cerebral damage was found. The data show the importance of the neurotoxic potential of cobalt.
10. The mechanisms of action of chemical agents (cobalt, nitrites, lead) and their bioaccumulation in various organs of rodents have been studied. Sodium nitrite (as a dietary supplement E250) administered in a single dose to induce acute hypoxia has been shown to cause significant morphological and haemoreological changes in the three types of blood cells. The data are relevant for assessing the side effects of the use of hypoxia-inducing dietary supplements to improve the physical endurance of athletes. The side effects of chronic cobalt intake in the form of a food supplement or included in the composition of joint implants have been sought. Mice at early puberty are most sensitive to chronic treatment with cobalt (II) compounds. Perinatal exposure to Co has been shown to affect body and organ weights (spleen, liver, kidneys, brain and testes), induce

pathohistological changes in target organs, alter haematological and biochemical parameters, iron content and transferrin receptor 1 expression in organs.

11. The use of two ionophore antibiotics as antidotes for lead intoxication has been studied in animal models. Lead has been found to alter the biodistribution of essential metal ions in the target

IV. Evaluation of the monographic work or equivalent publications submitted for participation in the competition for "ASSOCIATE PROFESSOR" by the candidate.

Assistant Professor E. Pavlova presented 5 publications (with rank Q1 - two, with Q2 - one and with Q3 - two), which correspond in weight to monographic work. My personal opinion is in favor of the application of original scientific developments, because modern trends in scientometrics give weight to original research.

V. General assessment of the applicant's compliance with the mandatory conditions and the mandatory quantitative criteria and scientometric indicators.

The procedure presents scientometric data according to LDACRB and RILDACRB, as well as the minimum criteria of BAS in area 4. Natural sciences, mathematics and informatics Professional field 4.3. Biological Sciences (Morphology), in sub-categories as follows:

1. By group of indicators "A" - 1. Successfully defended dissertation for awarding "Doctor" - presented Abstract (50 of 50 points)
2. By group of indicators "B" - Habilitation work or scientific publications - publications with rank Q1 - 2 are presented; Q2 - 1; Q3 - 2; (100 of 100 points)
3. By group of indicators "D" - Scientific publication in publications that are referenced and indexed in world-famous databases - 13 publications with rank Q1 - 5; Q2 - 5; Q3 - 1; Q4 - 2 (264 of the required 200 points)
4. By group of indicators "E" - Citations in scientific publications, monographs, collective volumes and patents, referenced and indexed in world-famous databases with scientific information - 34 citations (68 points out of the required 50 points)

The current application exceeds the required points according to the criteria (482 points of the required 400 points).

VI. Conclusion

This application fully meets the mandatory and specific conditions and scientometric criteria - for the academic position of "Associate Professor". Assistant Professor Ekaterina Pavlova has 54 scientific papers, 113 participations in scientific forums with a total impact factor of 62,293 and 114 citations. She participated in the competition with 18 publications and an abstract of PhD thesis, and 34 citations. Most publications are in Q1 and Q2 rank. She has been a project leader and has participated in numerous projects.

In conclusion, I strongly vote "YES" and recommend to the Scientific Jury in this competition the award of the academic position of "Associate Professor" to Dr. Ekaterina Pavlova, believing that her professional qualities and long-term achievements make her extremely suitable for a leading researcher and future researcher, a supervisor of graduates and doctoral students; from now on to be able to successfully create staff, to inspire new researchers, to pass on to them the great scientific experience she has gained under the expert guidance of her supervisors.

Sofia,
15.06.2021

Reviewer:



/ prof. K. Todorova-Hayrabedyan, DSc /