**OPINION STATEMENT**

By **Prof. Dr Elitsa Encheva-Mitsova, MD**

Professor at the Department of Imagining Diagnostics and Radiotherapy,

Medical University-Varna

*Re:* Dissertation titled: ***Nuclear Medicine Methods for Evaluation of Abnormal Parathyroid Glands in Patients with Primary and Secondary Hyperparathyroidism*** submitted by **Dr Albena Dimitrova Botushanova** for the academic and scientific degree “**Doctor**”

Higher education field: 7. Health and Sport,

Professional field: 7.1 Medicine,

Scientific specialty: Nuclear Medicine

By Order No. P-109-97 of 14.02.2019 of the Deputy- Rector of Medical University Varna, I have been appointed to give an opinion statement as a member of the Scientific Jury with reference to the defense of Dr Albena Botushanova’s dissertation.

***Brief Biographical Details***

Dr Albena Dimitrova Botushanova graduated in Medicine from Medical University Plovdiv in 1992. Since February 1995, she has been employed as a resident doctor at the Laboratory of Radiobiology of the Clinic of Radiotherapy, Section of Nuclear Medicine, St George University Hospital. Until 2000, she worked at the Immunological Laboratory of the Section of Nuclear Medicine, after which she continued her professional career as resident doctor at the Section of Nuclear Medicine, St George University Hospital, Plovdiv. Dr Botushanova has acquired two specialty degrees- in Radiobiology in 1998 and in Nuclear Medicine in 2003.

She is a member of the Bulgarian Society of Nuclear Medicine and the Union of Scientists.

She completed two training courses at the European School of Nuclear Medicine in 2008 and 2012 in Varna. In 2015 she completed training in Erlangen, Germany, and obtained a certificate for operation of hybrid PET/CT equipment.

Since 2015, she has been teaching Radiobiology at Medical College- Plovdiv, and since 2016 she has been a lecturer at Medical University of Plovdiv. She is fluent in Russian and English.

***Evaluation of the relevance of the topic and the formulation of aims and objectives:***

The topic of the dissertation is significantly relevant and important considering that the diagnostics of primary and secondary hyperparathyroidism is a great challenge. In some cases, the disease is not clinically manifested but there are deviations of calcium, phosphorus and parathyroid hormone serum levels. The leading diagnosis in these cases is a solitary parathyroid adenoma, occurring in 90% of the patients followed by primary hyperplasia of the parathyroid glands.

Nuclear medicine diagnostics of parathyroid adenoma and hyperplasia of parathyroid glands plays a major role in determining the therapy approach for hyperparathyroidism, and in particular the volume of the surgical intervention.

The aim and objectives of the dissertation are accurately formulated and logically derived from the literature review with view to studying the diagnostic capabilities of nuclear medicine methods for imaging of abnormal hyperfunctioning parathyroid glands in primary and secondary hyperparathyroidism. The eight objectives are suitable to achieve the aim.

***Evaluation of the dissertation:***

The dissertation is structured in accordance with the standard requirements and there is an alignment across core components. Dr Botushanova’s dissertation consists of 114 pages and contains the following chapters: introduction, literature review, aim and objectives, material and methods, results and discussion, conclusions, contributions, references. It is illustrated with 33 figures and 4 tables. The bibliographical reference includes 104 sources, 4 in Cyrillic.

The literature review of the dissertation consists of 35 pages and is thorough and detailed in content. It demonstrates a high level of author’s knowledge on the studied techniques- subtraction technique and single-isotope dual-phase technique, and reveals the author’s ability to analyze collected information.

In the period from 2004 to 2015, 94 patients were retrospectively studied. The applied nuclear medicine examinations with radiopharmaceuticals 99mTc-sestamibi,99mTc-tetrofosmin and 99mTc-pertechnetate are thoroughly discussed.

The selected material and the methods applied by Dr Botushanova contribute adequately to solving the set objectives.

The results and the discussion are addressed in one chapter, which facilitates the following up of the discussion of the relevant results. They are presented on 49 pages and are illustrated in detail. The discussion of the results demonstrates Dr Botushanova's ability to analyze her own results in the context of the selected literature data. The value, advantages and disadvantages of the used nuclear medicine methods in patients with primary and secondary hyperparathyroidism have been effectively studied, which emphasizes the significance of the dissertation.

I believe that the results obtained and their interpretation has achieved the aim and the objectives set forth in the dissertation.

***Conclusions and contributions:***

Dr A. Botushanova draws 11 conclusions and 9 contributions. The conclusions are clear, accurate and comprehensive and logically derive from the set objectives. There is also a diagnostic algorithm developed by the author and protocols for examination of abnormal parathyroid glands with PHPT and SHPT. The contributions presented in the dissertation objectively reflect the actual achievements of the author and are mainly of scientific and applied nature.

The abstract presents faithfully the content of the dissertation consisting of 74 pages.

In connection with the dissertation, the doctoral student presented 4 publications and three contributions to scientific forums, of which one international and two national forums. I think that they realistically represent the achievements of the doctoral student and promote them among the scientific society.

***Conclusion:***

*Dr Albena Botushanova’s dissertation titled: “Nuclear Medicine Methods for Evaluation of Abnormal Parathyroid Glands in Patients with Primary and Secondary Hyperparathyroidism" has a high scientific value and original scientific and applied contributions. Dr Botushanova is an excellent specialist with rich clinical experience.*

*All this gives me a reason to give a positive evaluation for awarding Dr Albena Botushanova with the academic and scientific degree of “Doctor” in the scientific specialty of Nuclear Medicine.*

20.02.2019 Prof. Dr Elitsa Encheva, MD