

## REVIEWER'S REPORT ON THE MASTER'S THESIS

Candidate: *Đỗ Thị Mỹ Hạnh*.

Thesis title:

- *In Vietnamese*: TẾ BÀO GỐC TRUNG MÔ DÂY Rốn - TỔNG QUAN HỆ THỐNG VÀ ĐỀ XUẤT CHO NGHIÊN CỨU ỨNG DỤNG TẠI VIỆT NAM

- *In English*: UMBILICAL CORD MESENCHYMAL STEM CELLS - SYSTEMIC ANALYSIS AND RECOMMENDATIONS FOR RESEARCH IN VIETNAM

Code: 84290.01QTD

Reviewer: Hoang Van Vinh, PhD

University: Institute of Microbiology and Biotechnology, VNU

### CONTENT

#### I. COMMENT:

##### 1. The necessity, scientific significance and practicality of the thesis:

The thesis addresses a topic of considerable scientific and practical significance in the field of biomedical engineering and regenerative medicine. Umbilical cord mesenchymal stem cells (UC-MSCs) have emerged as one of the most promising cell sources for therapeutic applications due to their favorable biological properties and growing clinical potential. The study systematically reviews and synthesizes evidence from production, preclinical, and clinical research, thereby providing a comprehensive overview of the current status of UC-MSC development worldwide.

The findings and recommendations presented in the thesis are valuable for guiding future research, standardization, and clinical translation of UC-MSC-based therapies in Vietnam.

##### 2. Reliability and relevance of the thesis (*which clearly states the non-duplication of the thesis, the relevance of thesis title to thesis content - of content to training major; reliability and modernity of research methodology, etc.*)

The thesis title is consistent with the research objectives and study content. The topic is relevant to the Master's program in Biomedical Engineering Technology, especially in the field of stem cell research and regenerative medicine.

The study follows a systematic review approach using the PRISMA 2020 guideline and the SWiM framework. The research methods are clearly described, and the process of study selection and data analysis is presented in a logical manner.

The thesis reviewed studies from major international databases and analyzed evidence from production, preclinical, and clinical research. The results are clearly presented and support the conclusions and recommendations of the study.

However, some limitations should be noted. The study did not perform a quantitative meta-analysis because of the high heterogeneity among studies. These limitations may affect the completeness of the evidence.

Overall, the thesis is relevant, scientifically sound, and meets the requirements of a master's level research project.

### **3. Advantages and disadvantages of the thesis's content, structure, and format**

#### **3.1. Advantages**

- The thesis addresses a timely and important topic in stem cell research and regenerative medicine.
- The study applies a systematic review approach based on PRISMA 2020 and SWiM guidelines.
- The research covers multiple aspects of UC-MSC development, including production, preclinical studies, and clinical applications.
- The study identifies important research gaps and challenges in the current UC-MSC field.
- The thesis provides practical recommendations that may support future research and application of UC-MSCs in Vietnam.

#### **3.2. Disadvantages**

- Due to the high variability among studies, a quantitative meta-analysis could not be performed.
- Some information on cell production and quality control was not fully reported in the original publications, limiting further analysis.
- Most recommendations were based on published evidence, and additional validation in the Vietnamese context is still needed.

## **II. QUESTIONING (Optional)**

Question 1:

This study identified important gaps in the production and quality control of UC-MSCs. In your opinion, which issue should be addressed first in Vietnam to improve the quality and safety of UC-MSC-based products?

Question 2:

Based on your systematic review, UC-MSCs showed promising results in several disease areas. Which disease indication do you think should be prioritized for future clinical research in Vietnam, and why?

**III. CONCLUSION** *(which clearly confirms the extent of satisfying requirements for a master thesis; whether the thesis can be submitted to the master thesis examination committee)*

The thesis addresses an important topic in stem cell research and has both scientific and practical value. The study was conducted using appropriate methods, and the objectives were successfully achieved.

Although some limitations exist, they do not affect the overall quality of the thesis. The thesis meets the requirements for a Master's thesis in Biomedical Engineering Technology. I recommend that the thesis be accepted for defense before the Master's Thesis Examination Committee.

Hanoi, ..6<sup>th</sup>...Jun....., 2026

**REVIEWER**

*(full name, sign)*

  
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Hoàng Văn Vinh

**REVIEWER'S REPORT ON THE MASTER'S THESIS**

Candidate: Do Thi My Hanh

Thesis title: Umbilical Cord Mesenchymal Stem Cells - Systematic Analysis and Recommendations for Research in Vietnam

Major: Biomedical Engineering Technology

Code: 84290.01QTD

Reviewer: Dr. Nguyen Le Khanh

University: Vietnam National University, International School

**CONTENT**

**I. COMMENT:**

**1. The necessity, scientific significance and practicality of the thesis:**

Research and clinical applications of umbilical cord-derived mesenchymal stem cells (UC-MSCs) have expanded rapidly over the last two decades. In contrast, research activities in Vietnam remain relatively fragmented, with limited clinical studies, inconsistent manufacturing standards, and an incomplete regulatory framework. Therefore, a comprehensive assessment of the current scientific landscape and future directions is both necessary and timely.

The thesis addresses an important scientific and practical need by systematically reviewing the development of UC-MSC research from manufacturing and quality control to preclinical and clinical applications. Furthermore, the study proposes recommendations tailored to the Vietnamese context, providing valuable information for researchers, clinicians, policymakers, and regulatory agencies involved in regenerative medicine.

**2. Reliability and relevance of the thesis** (*which clearly states the non-duplication of the thesis, the relevance of thesis title to thesis content – of content to training major; reliability and modernity of research methodology, etc.*)

The thesis topic is highly relevant to the Biomedical Engineering and Technology program, particularly in the areas of regenerative medicine, biotechnology, translational research, and healthcare innovation. The research methodology is appropriate and followed the PRISMA 2020 guidelines, which are internationally recognized standards for conducting systematic reviews.

**3. Advantages and disadvantages of the thesis's content, structure, and format**

**3.1. Advantages**

One of the major strengths of the thesis is the candidate's ability to synthesize a large volume of scientific literature and transform descriptive findings into meaningful interpretations. Rather than merely presenting trends in clinical trials, the author provides logical explanations for the observed increase in UC-MSK studies during the period 2021–2025.

The candidate demonstrates a commendable level of scientific objectivity when discussing the limitations of the review. In particular, the explanation for why a meta-analysis could not be performed is convincing and methodologically sound. The author correctly identifies heterogeneity in study design, treatment protocols, outcome measures, and reporting quality as major barriers to quantitative synthesis. This critical evaluation reflects a strong understanding of systematic review methodology and enhances the credibility of the study.

Rather than simply summarizing international experiences, the author attempts to bridge scientific evidence and practical implementation by proposing improvements in regulatory oversight, manufacturing standards, transparency, and clinical research development for Vietnam.

### **3.2. Disadvantages**

The thesis title uses the term “Systemic Analysis,” whereas the methodology employed throughout the study is a “Systematic Review.” These terms have distinct meanings in scientific research and should not be used interchangeably. The title should be revised to accurately reflect the research methodology.

Several important administrative and presentation errors were identified. The cover page incorrectly describes the document as an “M.A Thesis Proposal” rather than a completed Master's thesis. Additionally, the Certificate of Originality contains the phrase “dependent research” instead of “independent research,” resulting in an unintended semantic error.

Although these issues do not affect the scientific content, they require correction before final submission.

## **II. QUESTIONING (Optional)**

Among the recommendations proposed for Vietnam, which recommendation do you consider the most important and feasible to implement within the next five years, and why?

## **III. CONCLUSION** *(which clearly confirms the extent of satisfying requirements for a master thesis; whether the thesis can be submitted to the master thesis examination committee)*

The thesis addresses a highly relevant and emerging topic in regenerative medicine and stem cell research. The candidate demonstrates a strong ability to synthesize scientific evidence, critically evaluate existing literature, and formulate recommendations that are applicable to the Vietnamese context. In my opinion, the thesis satisfies the academic and scientific requirements

for a Master's degree in Biomedical Engineering and Technology. I recommend that the thesis be accepted and submitted to the Master Thesis Examination Committee for defense after revisions addressing the structural, formatting, and editorial issues identified above.

*Hanoi, 04 June, 2026*

**REVIEWER**

A handwritten signature in black ink, appearing to be 'N. L. Khanh', written in a cursive style.

Nguyễn Lê Khanh

Hanoi, 06/06/2026



## MINUTES OF MASTER THESIS DEFENSE

The master thesis defense session of student: Đỗ Thị Mỹ Hạnh (date of birth: 28/01/1999) was conducted at 08:45.. (hour/minute), on 06/06/2026 at VNU - International School.

### Thesis title:

- *In Vietnamese*: Tế bào gốc trung mô dây rốn - Tổng quan hệ thống và đề xuất cho nghiên cứu ứng dụng tại Việt Nam
- *In English*: Umbilical Cord Mesenchymal Stem Cells - Systemic Analysis and Recommendations for Research in Vietnam

Code: ...84290...01...QTD.....

Members of the Master thesis examination committee are present: 5/5

| No | Full name               | University/<br>Organizations                      | Role in<br>Committee | Note |
|----|-------------------------|---------------------------------------------------|----------------------|------|
| 1  | TS. Nguyễn Quang Thuận  | Trường Quốc tế, ĐHQGHN                            | Chairman             |      |
| 2  | TS. Nguyễn Lê Khanh     | Trường Đại học Công nghệ,<br>ĐHQGHN               | Reviewer             |      |
| 3  | TS. Hoàng Văn Vinh      | Viện Vi sinh vật và Công<br>nghệ sinh học, ĐHQGHN | Reviewer             |      |
| 4  | GS.TS. Nguyễn Đức Thuận | Trường Quốc tế, ĐHQGHN                            | Secretary            |      |
| 5  | TS. Thân Văn Thái       | Trường Quốc tế, ĐHQGHN                            | Committee<br>member  |      |

### PART I: INTRODUCTION

1. Representatives of VNU - International School made welcoming remarks including:

- Introduction of the master thesis defense and participants;
- Announcement about Decision of the President of Vietnam National University, Hanoi on establishing the Master thesis examination committee (Decision No. 1857/QĐ-ĐHQGHN issued on 13/05/2026).

### PART II: THESIS DEFENSE SESSION

1. TS. Nguyễn Quang Thuận – The Chair led the Master thesis examination committee.

2. GS. TS. Nguyễn Đức Thuận – The Secretary of the Committee announced the scientific background and conditions for master thesis defense of the candidate (candidate's scientific background file and academic results are attached).

3. The candidate Đỗ Thị Mỹ Hạnh made a presentation on the thesis.

4. TS. Nguyễn Lê Khanh and TS. Hoàng Văn Vinh – Reviewers commented on the thesis (with attached documents).

5. Questioning period from members of the Committee:

- Question 1: What issue should be addressed first in Vietnam to improve the quality of UC-MSc based product?

- Question 2: What recommendation you consider the most importance and feasible to implement in the next five years?

6. Candidate's answers

- Answer 1: The research findings on UC-MSc-based product by the researchers should be widely publicized.

- Answer 2: It need the break-through policy that are needed to encourage the development of both basic and clinical research for UC-MSc.

7. The Secretary of the Committee commented on the thesis conducting progress of the candidate (with attached document).

8. Committee's Deliberations:

- Election of Vote counting committee:

1. Chair: TS. Nguyễn Quang Thuận

2. Member: GS. TS. Nguyễn Đức Thuận

- The examination committee voted by secret ballot.

- The vote counting committee:

+ The Chair reported the vote counting result (with attached vote counting record).

- The Examination committee deliberated and came to a conclusion on the thesis examination by reaching a consensus on the assessment resolution on the thesis. The resolution concluded:

The thesis satisfies the requirement of the master thesis degree

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### PART III: OUTCOME OF THE EXAMINATION PROCESS

1. The Chair of the Vote Counting committee announced the result of the ballot on the thesis examination.
2. The Chair of the Examination Committee announced the resolution on the thesis examination.
3. The Chair of the Examination Committee made statements and gave controls to the organizer.

The thesis defense session ended at 09:30 (hour/minute), on 06/06/2026

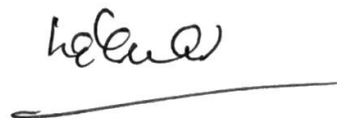
*The thesis evaluation committee approved the student's thesis with the result (score scale .....): 9.5 point (In word: Nine point Five .....).*  
*Students are required to revise some content as requested by the Council and submit the completed project to the Information and Library Center, Vietnam National University, Hanoi, as per regulations.*

**SECRETARY OF THE THESIS  
EXAMINATION COMMITTEE**



GS. TS. Nguyễn Đức Thuận

**CHAIR OF THE THESIS  
EXAMINATION COMMITTEE**



TS. Nguyễn Quang Thuận

**CERTIFICATION BY VNU - INTERNATIONAL SCHOOL  
P.P. RECTOR  
OFFICE OF ACADEMIC AFFAIRS**

*Hoàng Tuyết Minh*



Hanoi, 06/06/2026

## MINUTES OF VOTE COUNTING COMMITTEE OF THE MASTER THESIS EXAMINATION COMMITTEE

Pursuant to the Decision No. 1857/QĐ-DHQGHN issued on 13/05/2026 by President of Vietnam National University, Hanoi on establishing the Master thesis examination committee, the committee conducted a meeting at 08:45 (hour/minute), on 06/06/2026 at VNU - International School to examine the master thesis of the candidate Đỗ Thị Mỹ Hạnh.

### Thesis title:

- *In Vietnamese*: Tế bào gốc trung mô dây rốn - Tổng quan hệ thống và đề xuất cho nghiên cứu ứng dụng tại Việt Nam

- *In English*: Umbilical Cord Mesenchymal Stem Cells - Systemic Analysis and Recommendations for Research in Vietnam

**Major:** Master in Biomedical Engineering Technology

**Code:** 84290 - 01, QTD.....

The vote counting committee was voted:

1. Chair: TS. Hoàng Văn Vinh.....
2. Member: TS. Nguyễn Đức Thuận.....

The number of members presenting is 05/05, the members who are opponents are 02/05.

Number of votes distributed to members: 05...

Number of unused remaining votes: 0.....

Number of valid votes: 05...

Number of invalid votes: 0.....

Number of votes for the score 9.2 is: 01.....

Number of votes for the score 9.3 is: 01....

Number of votes for the score 9.5 is: 02....

Number of votes for the score 10 is: 01....

Number of votes for the score ..... is: .....

Average score: 9.5 / 10....

(In text: ..... Nine point Five .....)

Note: The thesis score is the average of scores marked by the examination committee's members presenting in the thesis defenses session, taken to one decimal place and not rounded.

**MEMBER OF THE VOTE  
COUNTING COMMITTEE**



GS. TS. Nguyễn Đức Thuận

**CHAIR OF THE VOTE  
COUNTING COMMITTEE**



TS. Hoàng Văn Vinh

**CERTIFICATION BY VNU - INTERNATIONAL SCHOOL**

**P.P. RECTOR**

**OFFICE OF ACADEMIC AFFAIRS**



Hoàng Tuyết Minh



## DEFENSE SCORE SHEET FOR MASTER THESIS

Pursuant to the Decision 1857/QĐ-ĐHQGHN issued on 13/05/2026 by President of Vietnam National University, Hanoi on establishing the Master thesis examination committee to examine the master thesis of the student Đỗ Thị Mỹ Hạnh (date of birth: 28/01/1999).

### Thesis title:

- *In Vietnamese*: Tế bào gốc trung mô dây rốn - Tổng quan hệ thống và đề xuất cho nghiên cứu ứng dụng tại Việt Nam

- *In English*: Umbilical Cord Mesenchymal Stem Cells - Systemic Analysis and Recommendations for Research in Vietnam

Code: ..84290..01..ATD.....

### Comments:

The thesis addresses an important topic in stem cell research and regenerative medicine. The study applies a systematic review approach using recognized guidelines and provides a comprehensive overview of current evidence on UC-MSCs.

Although some limitations exist, they do not affect the overall quality and value of the study. The thesis meets the requirements for a Master's thesis in Biomedical Engineering Technology and is recommended for defense.

- In number: ..... 9.5 ..... marks

- In text: .... Nine point five .... marks

Hoàng Văn Vinh



## DEFENSE SCORE SHEET FOR MASTER THESIS

Pursuant to the Decision 1857/QĐ-DH-QGHN issued on 13/05/2026 by President of Vietnam National University, Hanoi on establishing the Master thesis examination committee to examine the master thesis of the student Đỗ Thị Mỹ Hạnh (date of birth: 28/01/1999).

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- *In English*: Umbilical Cord Mesenchymal Stem Cells - Systemic Analysis and Recommendations for Research in Vietnam

Code: S4290-01 QTD.....

### Comments:

- The study provided valuable information for researchers, clinical researcher, policymakers involved in regenerative medicine.

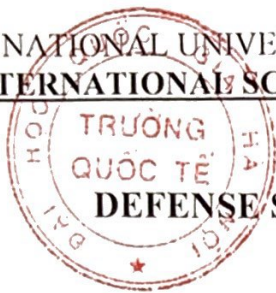
- The student has good performance in synthesizing scientific evidence, evaluating literature and writing report & publication.

- Some error: title, presentation should be revised accurately.

- In number: ..... 9.5 ..... marks
- In text: ..... Nine point five ..... marks

### Marker

Nguyễn Lê Khanh.



**DEFENSE SCORE SHEET FOR MASTER THESIS**

Pursuant to the Decision 1857/QĐ-DHQQHN issued on 13/05/2026 by President of Vietnam National University, Hanoi on establishing the Master thesis examination committee to examine the master thesis of the student Đỗ Thị Mỹ Hạnh (date of birth: 28/01/1999).

**Thesis title:**

- *In Vietnamese*: Tế bào gốc trung mô dây rốn - Tổng quan hệ thống và đề xuất cho nghiên cứu ứng dụng tại Việt Nam

- *In English*: Umbilical Cord Mesenchymal Stem Cells - Systemic Analysis and Recommendations for Research in Vietnam

**Code:** ...84.290.01.HTD.....

**Comments:**

→ The thesis has good outline

→ The result of the thesis is published in the Scopus-indexed system.

→ The student shows a good performance

→ The steps in Vietnam should be named clearer.

Result: (The mark of each committee member is on ... point scale, possibly odd to one decimal place):

- In number: ..... 9.2 ..... marks
- In text: ... nine point two ... marks

Hanoi, ..... 06 June ....., 2026  
**Marker**

Laksa

17 days 0 days 10 days



**DEFENSE SCORE SHEET FOR MASTER THESIS**

Pursuant to the Decision 1857/QĐ-DHQGHN issued on 13/05/2026 by President of Vietnam National University, Hanoi on establishing the Master thesis examination committee to examine the master thesis of the student Đỗ Thị Mỹ Hạnh (date of birth: 28/01/1999).

**Thesis title:**

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- *In English:* Umbilical Cord Mesenchymal Stem Cells - Systemic Analysis and Recommendations for Research in Vietnam

Code: 84290.01.010.....

**Comments:**

- Nội dung tiểu sử được trình bày và phân tích các cơ  
Tế bào gốc trung mô dây rốn và ứng dụng của nó  
- Các nghiên cứu về tế bào gốc trung mô và ứng dụng  
- Nếu có thể nghiên cứu thực tế sẽ có ý nghĩa thực  
hữu hơn  
- Nội dung của bài tiểu luận được trình bày và phân tích

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Result: *(The mark of each committee member is on ..... point scale, possibly odd to one decimal place):*

- In number: .....1.0..... marks
- In text: .....T.e.k..... marks

Hanoi, .....06 June....., 2026  
**Marker**



Nguyễn Thị Thuong



**DEFENSE SCORE SHEET FOR MASTER THESIS**

Pursuant to the Decision 1857/QĐ-DHQGHN issued on 13/05/2026 by President of Vietnam National University, Hanoi on establishing the Master thesis examination committee to examine the master thesis of the student Đỗ Thị Mỹ Hạnh (date of birth: 28/01/1999).

**Thesis title:**

- *In Vietnamese*: Tế bào gốc trung mô dây rốn - Tổng quan hệ thống và đề xuất cho nghiên cứu ứng dụng tại Việt Nam

- *In English*: Umbilical Cord Mesenchymal Stem Cells - Systemic Analysis and Recommendations for Research in Vietnam

**Code:** .....84.240.01...Q.T.D.....

**Comments:**

+, The topic is interesting and possessed the science and practical significances in healthcare in Viet Nam.

+, The performane of student was very good.

+, The study remain some limitations.

+, The student need to check again errors in typo and grammar on somewhere of the thesis.

Result: (The mark of each committee member is on ... .. point scale, possibly odd to one decimal place):

- In number: ..... 9.3 ..... marks
- In text: ... Not part three ... marks

Hanoi, 06 June ....., 2026

**Marker**

Đu  
Thân Văn Thái



Hanoi, 06/06/2026

**RESOLUTION OF THE MASTER THESIS  
EXAMINATION COMMITTEE**

Pursuant to the Decision 1857/QĐ-ĐHQGHN issued on 13/05/2026 by President of Vietnam National University, Hanoi on establishing the Master thesis examination committee to examine the master thesis of the student Đỗ Thị Mỹ Hạnh (date of birth: 28/01/1999).

**Thesis title:**

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- *In English:* Umbilical Cord Mesenchymal Stem Cells - Systemic Analysis and Recommendations for Research in Vietnam

**Code:** 84290.01 QTD.....

The thesis examination committee conducted a meeting at 08:45 (hour/minute), on 06/06/2026 at VNU - International School.

After the candidate's presentation on the thesis, opponents' review, committee members' comments, candidate's answers, the committee deliberated and came to a conclusion:

**1. The necessity, scientific significance and practicality of the thesis topic**

- The study presented a comprehensive assessment of the current scientific landscape and future direction.

- Scientific significance: the study addressed the development of UC-MSC research from manufacturing and quality control to preclinical and clinical application.

**2. Structure, research methodology, references, etc., of the thesis**

- Structure: well organized and clear.

- Research methodology: appropriate, followed the PRISMA 2020

guidelines

— References: appropriate and up-to-date

### 3. Research outcomes:

— The research successfully addressed the importance scientific and practical need by systematically reviewing the development of UC-MSC research from manufacturing and quality control to preclinical and clinical application.

### 4. Limitations and requests for thesis correction (if any):

— Check again several important administrative and presentation errors

— Lack of the quantitative meta-analysis data

### 5. Overall evaluation:

— The thesis address a highly relevant and emerging topic in regenerative medicine and stem cell research

— The thesis strong provide ability to synthesise scientific evidence critically evaluate existing literature and formulate recommendation and scientific requirements

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Thesis marked: ...9.5.../10...

Outcome of master thesis defense of candidate Đã...Thị...Mỹ...Hạnh

Qualified: ☒

Unqualified: ☐

(The thesis is qualified if the average score marked by the Committee is 5.5 or higher).

This resolution is passed by .05.../05... members of the Committee.

**SECRETARY OF THE THESIS  
EXAMINATION COMMITTEE**



GS. TS. Nguyễn Đức Thuận

**CHAIR OF THE THESIS  
EXAMINATION COMMITTEE**



TS. Nguyễn Quang Thuận

**CERTIFICATION BY VNU - INTERNATIONAL SCHOOL  
P.P. RECTOR  
OFFICE OF ACADEMIC AFFAIRS**



Hoàng Tuyết Minh