

**CHARACTERIZATION AND EVALUATION OF  
CIRCULATING ENDOGENOUS STEM CELLS IN  
DEGENERATIVE DISEASE**

**NUTTHAPONG MOONKUM**

**DOCTOR OF PHILOSOPHY  
IN BIOMEDICAL SCIENCE**

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**GRADUATE SCHOOL  
CHIANG MAI UNIVERSITY  
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**A THESIS SUBMITTED TO CHIANG MAI UNIVERSITY IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY  
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# CHARACTERIZATION AND EVALUATION OF ENDOGENOUS STEM CELLS IN DEGENERATIVE DISEASE

NUTTHAPONG MOONKUM

THIS THESIS HAS BEEN APPROVED TO BE A PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY  
IN BIOMEDICAL SCIENCE

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