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I have not committed plagiarism in any of the forms described in the ‘Manipal University Plagiarism Policy’. I have documented all methods, data and processes truthfully and I have not manipulated any data.

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Name of the Student        Jyoti Dubey        Place: Bangalore
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I, Prof. Ramaswamy S certify and attest that the work done by my Ph.D. student Ms. Jyoti Dubey is original and vouch that there is no plagiarism. The work has not been submitted for the award of degree/ diploma of the same University/ Institution where the work was carried out, or to any other University/ Institution.

Signature

Name of the Research Supervisor        Prof. Ramaswamy S
Designation        Professor
Institution        Institute for Stem Cell Biology and Regenerative Medicine
Date: 20th May 2019        Place: Bangalore
DECLARATION BY THE CANDIDATE

I declare that this thesis, submitted for the degree of Doctor of Philosophy to Manipal University, is my original work, conducted under the supervision of my guide Prof. Ramaswamy S. I also wish to inform that no part of the research has been submitted for a degree or examination at any University. References, help and material obtained from other sources have been duly acknowledged.

Candidate

Jyoti Dubey

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20th May 2019