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Correlating *in vitro* performance with physico-chemical characteristics of nanofibrous scaffolds for skin tissue engineering using supervised machine learning algorithms

Lakshmi Y. Sujeeun, Nowsheen Goonoo, Honita Ramphul, Itisha Chummun, Fanny Gimié, Shakuntala Baichoo and Archana Bhaw-Luximon

Note: Reports are unedited and appear as submitted by the referee. The review history appears in chronological order.

Note: This manuscript was transferred from another Royal Society journal without peer review.

Review History

RSOS-201293.R0 (Original submission)

Review form: Reviewer 1

Is the manuscript scientifically sound in its present form?
Yes

Are the interpretations and conclusions justified by the results?
Yes

Is the language acceptable?
Yes

Do you have any ethical concerns with this paper?
No

Have you any concerns about statistical analyses in this paper?
No

Recommendation?
Accept with minor revision (please list in comments)

Comments to the Author(s)
This work focuses on engineering of a polymeric scaffold for tissue regeneration. Interestingly, it applies statistical methods to optimize the physicochemical properties of the scaffold using experimental in vitro data and physicochemical data of electrospun scaffolds tested for skin tissue engineering to model scaffold performance using machine learning. Correlation was sort between the physical properties and the MTT assay of L929 fibroblasts cells on the scaffolds. Six supervised learning algorithms were trained using Seaborn/Scikit-learn Python libraries. This work will add significant value to the readers as a first preliminary study on machine learning methods for the prediction of cell-material interactions on nanofibrous mats. Below are some minor revisions:

1) The language and grammar need to be revisited to improved readability
2) Sub-headings need to be made more descriptive
3) More detail to be provided on the quantities/composition of the polymers used in synthesizing the fibrous scaffolds

Decision letter (RSOS-201293.R0)

We hope you are keeping well at this difficult and unusual time. We continue to value your support of the journal in these challenging circumstances. If Royal Society Open Science can assist you at all, please don't hesitate to let us know at the email address below.

Dear Dr LUXIMON:

Title: Correlating in vitro performance with physico-chemical characteristics of nanofibrous scaffolds for skin tissue engineering using supervised machine l
Manuscript ID: RSOS-201293

Thank you for submitting the above manuscript to Royal Society Open Science. On behalf of the Editors and the Royal Society of Chemistry, I am pleased to inform you that your manuscript will be accepted for publication in Royal Society Open Science subject to minor revision in accordance with the referee suggestions. I apologise this has taken longer than usual. Please find the reviewers' comments at the end of this email.

The reviewers and handling editors have recommended publication, but also suggest some minor revisions to your manuscript. Therefore, I invite you to respond to the comments and revise your manuscript.

Because the schedule for publication is very tight, it is a condition of publication that you submit the revised version of your manuscript before 11-Nov-2020. Please note that the revision deadline will expire at 00.00am on this date. If you do not think you will be able to meet this date please let me know immediately.

To revise your manuscript, log into https://mc.manuscriptcentral.com/rsos and enter your Author Centre, where you will find your manuscript title listed under "Manuscripts with Decisions". Under "Actions," click on "Create a Revision." You will be unable to make your revisions on the originally submitted version of the manuscript. Instead, revise your manuscript and upload a new version through your Author Centre.

When submitting your revised manuscript, you will be able to respond to the comments made by the referees and upload a file "Response to Referees" in "Section 6 - File Upload". You can use this to document any changes you make to the original manuscript. In order to expedite the processing of the revised manuscript, please be as specific as possible in your response to the referees.

When uploading your revised files please make sure that you have:

1) A text file of the manuscript (tex, txt, rtf, docx or doc), references, tables (including captions) and figure captions. Do not upload a PDF as your "Main Document".
2) A separate electronic file of each figure (EPS or print-quality PDF preferred (either format should be produced directly from original creation package), or original software format)
3) Included a 100 word media summary of your paper when requested at submission. Please ensure you have entered correct contact details (email, institution and telephone) in your user account
4) Included the raw data to support the claims made in your paper. You can either include your data as electronic supplementary material or upload to a repository and include the relevant doi within your manuscript
5) All supplementary materials accompanying an accepted article will be treated as in their final form. Note that the Royal Society will neither edit nor typeset supplementary material and it will be hosted as provided. Please ensure that the supplementary material includes the paper details where possible (authors, article title, journal name).

Supplementary files will be published alongside the paper on the journal website and posted on the online figshare repository (https://figshare.com). The heading and legend provided for each supplementary file during the submission process will be used to create the figshare page, so please ensure these are accurate and informative so that your files can be found in searches. Files on figshare will be made available approximately one week before the accompanying article so that the supplementary material can be attributed a unique DOI.

Once again, thank you for submitting your manuscript to Royal Society Open Science. The chemistry content of Royal Society Open Science is published in collaboration with the Royal Society of Chemistry. I look forward to receiving your revision. If you have any questions at all, please do not hesitate to get in touch.

Kind regards,
Dr Laura Smith
Publishing Editor, Journals

Royal Society of Chemistry
Thomas Graham House
Science Park, Milton Road
Cambridge, CB4 0WF
Royal Society Open Science - Chemistry Editorial Office

On behalf of the Subject Editor Professor Anthony Stace and the Associate Editor Professor Kim Jelfs.

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RSC Associate Editor:
Comments to the Author:
Please meet the final requests of the referee.

RSC Subject Editor:
Comments to the Author:

(There are no comments.)

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Reviewer comments to Author:
Reviewer: 1

Comments to the Author(s)
This work focuses on engineering of a polymeric scaffold for tissue regeneration. Interestingly, it applies statistical methods to optimize the physicochemical properties of the scaffold using experimental in vitro data and physicochemical data of electrospun scaffolds tested for skin tissue engineering to model scaffold performance using machine learning. Correlation was sort between the physical properties and the MTT assay of L929 fibroblasts cells on the scaffolds. Six supervised learning algorithms were trained using Seaborn/Scikit-learn Python libraries. This work will add significant value to the readers as a first preliminary study on machine learning methods for the prediction of cell-material interactions on nanofibrous mats. Below are some minor revisions:

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Author's Response to Decision Letter for (RSOS-201293.R0)

See Appendix A.

Decision letter (RSOS-201293.R1)

We hope you are keeping well at this difficult and unusual time. We continue to value your support of the journal in these challenging circumstances. If Royal Society Open Science can assist you at all, please don't hesitate to let us know at the email address below.

Dear Dr LUXIMON:

Title: Correlating in vitro performance with physico-chemical characteristics of nanofibrous scaffolds for skin tissue engineering using supervised machine l
Manuscript ID: RSOS-201293.R1

It is a pleasure to accept your manuscript in its current form for publication in Royal Society Open Science. The chemistry content of Royal Society Open Science is published in collaboration with the Royal Society of Chemistry.

The comments of the reviewer(s) who reviewed your manuscript are included at the end of this email.

Thank you for your fine contribution. On behalf of the Editors of Royal Society Open Science and the Royal Society of Chemistry, I look forward to your continued contributions to the Journal.

Yours sincerely,
Dr Laura Smith
Publishing Editor, Journals

Royal Society of Chemistry
Thomas Graham House
Science Park, Milton Road
Cambridge, CB4 0WF
Royal Society Open Science - Chemistry Editorial Office

On behalf of the Subject Editor Professor Anthony Stace and the Associate Editor Professor Kim Jelfs.

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RSC Associate Editor
Comments to the Author:
(There are no comments.)

****

Reviewer(s)' Comments to Author:

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Appendix A

Response to reviewer comments

1) The language and grammar need to be revisited to improved readability.

We have thoroughly revised the manuscript for language and grammar.

2) Sub-headings need to be made more descriptive.

Sub-headings have been modified as indicated in red.

3) More detail to be provided on the quantities/composition of the polymers used in synthesizing the fibrous scaffolds.

More details have been added in the experimental section in red.