

## The what, why and how of curly hair: a review

Elsabe Cloete, Nonhlanhla P. Khumalo and Malebogo N. Ngoepe

### Article citation details

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### Review timeline

Original submission: 10 August 2019  
Revised submission: 24 September 2019  
Final acceptance: 16 October 2019

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

## Review History

### RSPA-2019-0516.R0 (Original submission)

#### Review form: Referee 1 (Gillian E. Westgate)

Can the paper be shortened without overall detriment to the main message?

Yes

Do you think some of the material would be more appropriate as an electronic appendix?

No

Do you have any ethical concerns with this paper?

No

### Recommendation?

Accept with minor revision (please list in comments)

### Comments to the Author(s)

This is a very readable review of what is a complex topic that relies on many disciplines for its study. I really enjoyed reading the paper and offer the following suggestions to help make some small improvements.

line 136 -137 please check this sentence as it does not quite read correctly?

Furthermore, reliability [of] available studies that used curly hair [from] one or two individuals from non-African ancestry....

Line 143 - when referring to Why What How - I suggest re-iterating the questions again to keep the reader of this review clear about its objectives.

Fig 1 does not sufficiently show the retrocurvature aspect of the follicle that is know to be a fact in curly hair follicles. Furthermore the bulb is not show as hooked which is also known from histology. If the diagram is illustrative, then these features should be referenced in the Fig legend.

Line 179. The location of the bulge in human hair is not anatomically distinct. I would suggest that the authors describe the bulge as sitting at the isthmus of the follicle. The bulge is a formation of the outer root sheath and does not (to my knowledge) have its location between inner and outer root sheaths.

269 and 370 the authors refer to keratin assisting proteins which is a non-typical definition for KAP. While the KAPs may assist keratins, in the general nomenclature they are known as keratin associated proteins, and should be referred to thus.

446 - this is an interesting observation and I would suggest that the fine stick straight phenotype is a feature of senile hair whereas the same person may have had c= wavy hair when young. So, perhaps the authors can also mention the impact of age on fibre properties and that age match should be a factor in study design?

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I suggest cortical cells comprise aggregated MFs (cells are formed earlier that the MFs!)

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488 - The authors could consider referencing my review below for biology and genetic studies on hair curl.

Westgate GE, Ginger RS, Green MR. The biology and genetics of curly hair. *Exp Dermatol*. 2017 Jun;26(6):483-490. doi: 10.1111/exd.13347. Review.

515 "developed from the epidermis and dermis downwards....

558 - it would be nice to mention Bruno Bernard by name here?

## Review form: Referee 2 (Kenzo Koike)

**Can the paper be shortened without overall detriment to the main message?**

Yes

**Do you think some of the material would be more appropriate as an electronic appendix?**

Yes

**Do you have any ethical concerns with this paper?**

Yes

**Recommendation?**

Accept as is

**Comments to the Author(s)**

I think that it is a very good review by classifying various papers by purpose and examining their contents. It is wonderful to cover many papers from old to recent.

**Decision letter (RSPA-2019-0516.R0)**

17-Sep-2019

Dear Dr Ngoepe,

On behalf of the Reviews Editor, I am pleased to inform you that your Manuscript RSPA-2019-0516 entitled "The what, why and how of curly hair. A review" has been accepted for publication subject to minor revisions in Proceedings A. Please find the referees' comments below.

The reviewers have recommended publication, but also suggest some minor revisions to your manuscript. Therefore, I invite you to respond to the reviewers' comments and revise your manuscript. It is a condition of publication that you submit the revised version of your manuscript within 7 days. If you do not think you will be able to meet this date please let me know in advance of the due date.

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- Acknowledgements
- Funding statement

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\*Describe (a) the study (b) its key findings and (c) its implications.

\*State why this work is newsworthy, be concise and do not overstate (true 'breakthroughs' are a rarity).

\*Ensure that you include valid contact details for the lead author (institutional address, email address, telephone number).

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Once again, thank you for submitting your manuscript to Proceedings A and I look forward to receiving your revision. If you have any questions at all, please do not hesitate to get in touch.

Best wishes

Raminder Shergill  
proceedingsa@royalsociety.org  
Proceedings A

on behalf of  
Professor Michel Destradre  
Reviews Editor  
Proceedings A

Reviewers' Comments to Author:

Referee: 1

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Referee: 2

Comments to the Author(s)

I think that it is a very good review by classifying various papers by purpose and examining their contents. It is wonderful to cover many papers from old to recent.

## Author's Response to Decision Letter for (RSPA-2019-0516.R0)

See Appendix A.

## Decision letter (RSPA-2019-0516.R1)

16-Oct-2019

Dear Dr Ngoepe

On behalf of the Editor, I am pleased to inform you that your manuscript entitled "The what, why and how of curly hair. A review" has been accepted in its final form for publication in *Proceedings A*.

Our Production Office will be in contact with you in due course. You can expect to receive a proof of your article soon. Please contact the office to let us know if you are likely to be away from e-mail in the near future. If you do not notify us and comments are not received within 5 days of sending the proof, we may publish the paper as it stands.

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Thank you for your submission. On behalf of the Editors of the journal, we look forward to your continued contributions to the Journal.

Best wishes

Raminder Shergill,  
Proceedings A Editorial Office  
[proceedingsa@royalsociety.org](mailto:proceedingsa@royalsociety.org)

# Appendix A

## Response to Reviewers Comments

We wish to thank the reviewers for their comments. They were insightful and have helped to strengthen our manuscript. Please see below for itemised responses to the issues raised.

### Comments to the Author(s)

This is a very readable review of what is a complex topic that relies on many disciplines for its study. I really enjoyed reading the paper and offer the following suggestions to help make some small improvements.

**Line 136 -137: Please check this sentence as it does not quite read correctly? Furthermore, reliability available studies that used curly hair one or two individuals from non-African ancestry....**

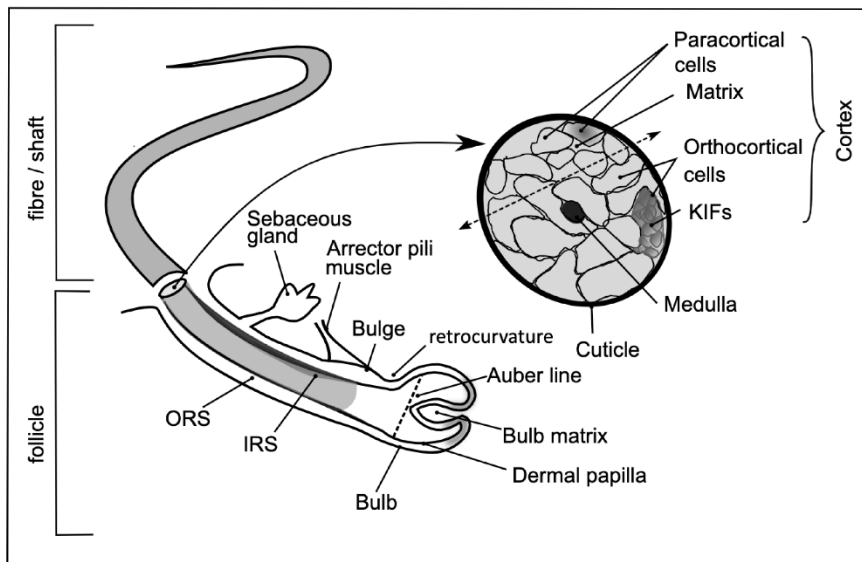
Lines 136 – 138 have been adapted to: Furthermore, reliability of available studies that used curly hair from one or two individuals of non-African ancestry are too limited in scope to generalised results.

**Line 143: When referring to Why What How - I suggest re-iterating the questions again to keep the reader of this review clear about its objectives.**

Lines 143 – 146 have been adapted to: In seeking to answer the three questions through the literature review (i.e 'what' does curly hair look like (structurally), 'why' does some hair curl, and 'how' does curly hair behave), it was necessary to separate the various research activities on curly hair into sensible categories.

**Fig 1 does not sufficiently show the retrocurvature aspect of the follicle that is know to be a fact in curly hair follicles. Furthermore the bulb is not show as hooked which is also known from histology. If the diagram is illustrative, then these features should be referenced in the Fig legend.**

Figure 1 has been updated to reflect the points mentioned.



**Line 179: The location of the bulge in human hair is not anatomically distinct. I would suggest that the authors describe the bulge as sitting at the isthmus of the follicle. The bulge is a formation of the outer root sheath and does not (to my knowledge) have its location between inner and outer root sheaths.**



Lines 179 – 180 have been adapted to: The bulge, being one of the stem cell reservoirs that sustain lower follicle growth, sits at the isthmus of the follicle.

**Lines 269 and 370: The authors refer to keratin assisting proteins which is a non-typical definition for KAP. While the KAPs may assist keratins, in the general nomenclature they are known as keratin associated proteins, and should be referred to thus.**

Lines 268 – 270 have been adapted to: Accordingly, the cortex forms the greater part of the fibre and comprises keratin proteins (KPs) that are imbedded in an amorphous space, called the matrix. The matrix is composed of keratin associated proteins (KAPs) and other structures, not relevant here.

Line 371 has been adapted to: Keratin assisting/associating structures in the cortex

**Line 446: This is an interesting observation and I would suggest that the fine stick straight phenotype is a feature of senile hair whereas the same person may have had wavy hair when young. So, perhaps the authors can also mention the impact of age on fibre properties and that age match should be a factor in study design?**

The observation made refers to the mechanical-dimensional relationship (lines 444-446). While we agree that age has an influence on hair thickness, the introduction of this parameter is likely to introduce too much complexity to the current train of thought. Furthermore, introduction of the influence of age on hair thickness, would be incomplete without mentioning other influential factors on hair thickness such as nutrition, genetics, etc. Since the primary focus of the paper is on curvature, rather than hair thickness, and the specific text considers mechanical-dimensional linkages, the authors have chosen to focus on that aspect of the paper.

**Line 279: Cortical cells are formed by aggregated MFs. I suggest cortical cells comprise aggregated MFs (cells are formed earlier than the MFs!)**

Line 280 has been adapted to: Cortical cells comprise aggregated MFs, which in turn comprise aggregated IFs.

**Should Fig 3 and 4 legend reference the original Japanese study Ref 53/54?**

The caption for Figures 3 and 4 now include (adapted from (53,54))

**Line 488: The authors could consider referencing my review below for biology and genetic studies on hair curl. Westgate GE, Ginger RS, Green MR. The biology and genetics of curly hair. Exp Dermatol. 2017 Jun;26(6):483-490. doi: 10.1111/exd.13347. Review.**

Line 490 has been adapted to: Westgate, Ginger & Green (75) offered a valuable review of the biology and genetics of the curly fibre.

**Line 515: developed from the epidermis and dermis downwards....**

Lines 516 – 518 have been adapted to: The hair follicle (described earlier) is a dynamic structure, developing from the epidermis and dermis downwards, that is subjected to different cycles (25,26)

**Line 558: It would be nice to mention Bruno Bernard by name here?**

Lines 559 – 562 have been adapted to: There are still many data gaps when considering the reason for fibre curvature. As aptly described by Bernard, 'much knowledge about hair follicle biology have been acquired in the last 70 years, but the code for molecular and cellular behaviour of the follicle has not yet been broken' (24)