Author's response to reviews

Title: Dermatitis associated with exposure to toxic cyanobacterium during recreational water exposure

Authors:

Nicholas J Osborne (nicholas.osborne@mcri.edu.au)
Glen R Shaw (g.shaw@griffith.edu.au)

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Dr Nicholas Osborne
Murdoch Childrens Research Institute
Royal Children’s Hospital
Flemington Road
PARKVILLE 3052
Victoria, Australia

Dear Editor

The authors would like to thank the reviewers for their thoughtful and insightful comments on our paper entitled “Dermatitis associated with exposure to toxic cyanobacterium during recreational water exposure”. We have responded to the reviewer’s questions and comments and made changes to both the text (tracked changes) and listing below.

If you have any further queries or comments please feel free to contact me at any time.

Yours Sincerely

Dr NJ Osborne, PhD
Review of Joanna Mankiewicz-Boczek

The manuscript "Dermatitis associated with exposure to toxic cyanobacterium during recreational water exposure" can be accepted if the title will be modified and several details will be completed.

See details below:

1) Title “toxic cyanobacterium” – the authors wrote only about symptoms similar to toxic Lyngbya majuscula blooms, however they did not determined a concentration of cyanobacterial toxins produced by Lyngbya, therefore it was not proven that Lyngbya majuscula are toxic cyanobacterium in this study. The authors only suggest on the basis on symptoms that it could be caused by toxic Lyngbya majuscula blooms. Therefore the title should be changed because the text does not consist any description of amount of toxins and it is only speculation that the toxic symptoms are connected with occurrence of L. majuscula.

Comment

*Title changed to read “Dermatitis associated with exposure to marine cyanobacterium during recreational water exposure“*

2) Introduction

Line 47: The authors wrote only about “highly toxic chemicals”, but they did not give any details, name etc. of these toxins?
Comment:

Sentence changed to read:

“Lyngbya majuscula is a cyanobacterium that has been found to contain highly toxic chemicals including lyngbyatoxin A and debromoaplysiatoxin that cause irritant contact dermatitis [1].”

Secondly, the authors described the symptoms of like-Lyngbya influence in the part “Material and Methods”. In my opinion, about different kind of toxins and their symptoms, which are produced by Lyngbya should be written also in the part “Introduction”. It is connect with fact that not all readers could know well this kind of toxic cyanobacteria in comparison to (example) microcystin-producing cyanobacteria.

Comment:

Paragraph added to introduction:

“Dermatitis caused by L. majuscula was recorded in swimmers with symptoms similar to a burn, usually appearing in the genital, perineum and perianal areas. Initial symptoms of erythema and burning sensations, appearing a few hours after exposure gave way to blister formation and deep desquamation, lasting up to several days (Grauer and Arnold, 1961). Histopathologic examination of human skin exposed to L. majuscula found acute, vesicular dermatitis consistent with contact dermatitis on topical application. Microscopic examination revealed superficial desquamation, oedema of the epidermis with vesicles of various sizes within the epidermis (stratum malpighii). Some vesicles contained polymorphonuclear leukocytes and red blood cells and the deepest portion of
the epidermis was infiltrated by polymorphonuclear leukocytes. The superficial dermis showed infiltration of both chronic and acute inflammatory cells including mononuclear cells, eosinophils and neutrophils (Grauer and Arnold, 1961). In an animal model a similar set of symptoms and timelines have been observed with the application of cyanobacterial metabolites lyngbyatoxin A and debromoaplysiatoxin [1].

3) Material and methods

Is it possible to describe or to cite a method applied to phytoplankton analysis including determination of Lyngbya majuscula occurrence?

Comment:

L. majuscula is not a phytoplankton, it is a macro benthic cyanobacterium and so no method was applied to “phytoplankton analysis”. As this is a macro algae it is readily identified macroscopically, although microscopic examination of filaments was also undertaken.

4) Results

Is it possible to add a data of biomass and toxicity of Lyngbya majuscula to comparison of frequency of symptoms like-Lyngbya?

Comment:

Unfortunately, the addition of biomass and toxicity data is not possible, despite the authors’ obvious desire. No samples for toxicological analysis were procured for this study, and accurately measuring biomass is not achievable (an estimated...
400 tons was deposited on a single beach in Moreton bay). This is why a descriptive epidemiological paper was written.

The manuscript does not consist any description of amount of toxins and it is only speculation that the toxic symptoms are connected with occurrence of *L.majuscula*.

Comment:

*That is a correct comment. It is a descriptive epidemiology paper with a dermatological outcome. The uniqueness (skin peeling, redness, itching and blistering in the perianal area after marine recreational water activity) and severity of the symptoms (attendance at first aid station) of the outcome in an area where *L. majuscula* is known to exist point strongly toward this as the causative factor, considering the literature. Identification of the toxin in a sample of *L. majuscula* would have been preferable but it was not possible.*
Review of Prue Hart

This is a very confusing manuscript. It details the report of symptoms which the authors hypothesise are due to L. majuscula infections. I searched this manuscript for evidence that there may have been a bloom during Jan-Feb 1998. (aim is to ascertain any link between health consequences and timing to outbreaks) and only found a statement in the Summary at the end that ‘This was also the only period that rangers of the Queensland National Parks Service identified the presence of L. majuscula on Fraser Island’. This identification requires expansion, for example, a quantification of the L majuscula identified, how tested, how often, how verified.

Comment:
We realise that the readership of this journal may not be familiar with epidemiology, which may be leading to the confusion, but the authors feel this would be a valuable contribution to the dermatological literature considering the outcome, dermatitis. L. majuscula is a cyanobacterium, not a bacterium. It is not an infectious agent. The toxins found in it cause irritant contact dermatitis. This is a descriptive epidemiological paper on an outbreak of dermatitis, and hence there is no further data to add apart from evidence of the presence of Lyngbya majuscula from the reports of the Queensland National Parks Service.

I am uncertain as to what is new in this manuscript.

Comment:
The data presented here is novel. The descriptive epidemiology on this outbreak is new. To many readers it will be their introduction to this phenomenon of dermatitis as caused by a cyanobacterium in Australia. This is the first publication to provide the most detailed evidence of an outbreak of dermatitis on Fraser Island and how it may be linked to the presence of the toxic marine cyanobacterium L. majuscula.

All symptoms remain just an association or correlation with a proposed algae.

Comment:
This is correct and the data fall into the same category as do many diseases and their ascribed causes i.e. colorectal cancer and consumption of red meat. It is a common technique used by epidemiologists.

There appears no convincing link in the manuscript as it is presented that Lyngbya majuscula was responsible at all.
Comment:
The authors agree with this comment. We only present the data we have collected. We agree that more data would need to be collected for an unequivocal association to be made. The enormous quantity of symptoms (that strongly relate to those of *L. majuscula* exposure) in the single season when *L. majuscula* was present and their complete absence in 4 other years is presented. The authors reported the high proportion of dermatologically-related cases presenting to a first aid station of a irritant contact dermatitis type that relate well those of *Lyngbya* exposure.

This is all the more confusing due to the second last sentence in the Discussion suggesting that there was not a bloom, but instead more recreational water users.

Comment:
The sentence postulated that the recent increase in reports of *Lyngbya*-like symptoms is due to increased potential numbers of individuals exposed. It does not say there was not a bloom. It postulated there was not an increase in bloom size.

Minor Essential Revisions:
The manuscript was poorly proof-read.

Comment:
*Manuscript proof read again and errors have been corrected.*

See line 37, page 2; third sentence of the Introduction;

Comment:
“in” deleted

the meaning of the last sentence of para 1 of the Introduction;
While high rates of severe dermatitis have not been found amongst recreational water users bathing in areas known to be experiencing cyanobacterial blooms [5], periodic outbreaks of dermatitis have been reported in the literature every 10 years or so since the early 1950s [6-10].

Changed to read:
High rates of severe dermatitis have not been found amongst recreational water users bathing in areas known to be experiencing cyanobacterial blooms [5]. However, periodic outbreaks of dermatitis have been reported in the literature every 10 years or so since the early 1950s [6-10].

**line 61 of the Introduction p3;**
**Comment:**
“recreation” added

**line 78 page 4;**
**Comment:**
“Information recorded by the Queensland National Parks Service rangers included date of birth, date of incident, postcode or country of origin of patient, location where treated, sex, occupation, notes on type or symptoms of injury, and medication or action that was taken for the summers of the years 1998-2001.”

**changed to read**
“Information recorded by the Queensland National Parks Service rangers included date of birth, date of incident, postcode or country of origin of patient, location where treated, sex, occupation, notes on type or symptoms of injury, and medication or action that was taken for the summers of the years 1998-2001.”

**line 87 page 4; last sentence of the Introduction;**
**Comment**
*Euphemisms altered to “colloquialisms”*

**first sentence of the Results.**

**Comment**

**Sentence changed to read:**

“There were 176 recorded presentations to first aid stations for the dates shown in Figure 2.”
Review of Wolfgang Uter

Major revisions:
Nil

Minor revisions

I 32: add "the" to make clearer that there is just one station on Fraser Island

Comment: "the" added

I 37: one "in" is enough

Comment: "in" deleted

I 47: better "some" instead of "those", as the latter could suggest that the algae toxins are the only ones causing - btw - irritant contact dermatitis (and not contact irritant dermatitis)

Comment:

Altered to read:

"Some" replaced "those"

"irritant contact dermatitis"

I 82-94: please cut back the "Microsoft references" to a normal extent. It would be sufficient to state "data was collected using Microsoft Excel and analysed with SPSS (version XY)."

Comment:
Altered to read:

“. Data were collected using Microsoft Excel and analysed with SPSS [12].”

I 94: are the authors sure that the listed terms are euphemisms, and not just colloquial synonyms? I could agree that "mermaid's hair" is an euphemism for a nasty alga, but I am not so sure about "dickweed"!

Comment:
Dickweed is the term used by fishers on the trawlers in the area for this cyanobacterium. After spending time pulling it off nets, once they urinated off the boat, they found, to their detriment, the contact irritant toxins had been transferred to their penises.

Euphemisms altered to “colloquialisms”

I 98: one "were" seems enough

Comment:
One “were” removed

I 108: "excluded"? or rather "included"!

Comment:
Sentence changed to read “Other reports excluded as not potentially due to L. majuscula exposure included bites, burns (from hot objects) or gastrointestinal problems.”
I 144: please explain "MRWA" upon first mention

Comment:

“Marine recreational water activity” added

- I 190: the authors mention the erection of warning signs. Could they mention when these were put up, and whether this could have led to any increase of the consultation rate due to increased awareness?

Comment:

*These were erected after the April 1998. The authors consider they had no effect on water exposure. Added to text* "Signs were not erected until April 1998, and in only one location and hence would not have affected water exposure significantly."

- Table 1 is pretty much a summary of data presented in Fig. 2 and could thus be omitted, if space restrictions are an issue

Comment:

*If the editors agree, delete table 1*

- References: #15 and #16 may mean something to the authors, but these are not references proper!

Comment:

*References have been altered to an acceptable style.*