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1 ***Porospora gigantea***

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14 **Summary** (1002/1000 characters)

15 The apicomplexan parasite *Porospora gigantea* (Van Beneden, 1869) Schneider, 1875 is a
16 marine septate intestinal eugregarine of *Homarus gammarus*, with a poorly known
17 pathogenicity. Previously named *Gregarina gigantea*, it presents three outstanding
18 characteristics according to the literature: (1) a gigantic size of its trophozoite stages with (2)
19 a remarkable gliding speed, which are the largest and the fastest recorded to date for any
20 Apicomplexa, and (3) an ability to accumulate as very specific cyst forms in the chitinous
21 folds of the lobster rectum. These particular developmental stages and the gliding speed of
22 *P. gigantea* were recently documented, upon its genome sequenced. Molecular data
23 confirmed its phylogenetic position within the crustacean gregarines, but raised some
24 taxonomic concerns. Comparative analysis of *P. gigantea* genome with those of other
25 Apicomplexa revealed its divergent gliding motility apparatus, broadening our knowledge of
26 the adaptative capacities of Apicomplexa.

27 (1459/1450 characters)

28 **Key facts**

29 The life cycle of *P. gigantea* is only partially understood.

30 Released trophozoites grow in the lumen of lobster hind-guts, where they reach extremely
31 large sizes and display the fastest ever recorded gliding speed (60-100 $\mu\text{m/s}$) for any
32 Apicomplexa. Trophozoites develop into cysts that accumulate in the lobster's rectal
33 ampulla.

34 Each cyst contains thousands of gymnosporidia, respectively consisting of hundreds of zoites
35 arranged radially pointing their apical tips outward. These gymnosporidia are hypothesized to
36 then infect a yet to be identified mollusk host (as it is described in *Nemaptosis*) where sexual
37 reproduction, that has never been directly observed, would likely occur.

38 **Disease facts**

39 Currently, the pathogenicity that *P. gigantea* causes to its host *H. gammarus* is not well
40 documented.

41 Whether *P. gigantea* is detrimental to its host, mutualistic or beneficial remains to be
42 assessed, as gregarines were recently proposed to display a spectrum of symbiotic behaviors
43 to their invertebrate hosts.

44 **Taxonomy and classification**

45 *P. gigantea* is the type species of the genus *Porospora* (type host, *H. gammarus*). *Porospora*
46 is the type genus of the Porosporidae family. Currently, this family contains the genera
47 *Thiriotia* and *Nematopsis*, but recent molecular phylogenies demonstrate that these two
48 groups do not cluster together.

49 Phylum: Apicomplexa

50 Class: Conoidasida

51 Order: Eugregarinorida

52 Family: Porosporidae

53 Genus: *Porospora*

54 Species: *P. gigantea*

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69 **Declaration of interests**

70 The authors declare no competing interests.

71

72 **Resources**

73 - CryptoDB Data Set: Porospora gigantea A Genome Sequence and Annotation

74 https://cryptodb.org/cryptodb/app/record/dataset/DS_67c80917e2

75 - CryptoDB Data Set: Porospora gigantea B Genome Sequence and Annotation

76 https://cryptodb.org/cryptodb/app/record/dataset/DS_c8ace9e1f6

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