

APPENDIX S2. CHARACTER/TAXON MATRIX

Data matrix of 53 characters for 3 outgroups (*Agorophius*, *Cynthiacetus*, and *Zygorhiza*) and 21 extinct and extant physeteroid taxa. All characters are unordered; 0, primitive state; 1, 2, 3, derived states; a, variable between 0 and 1; b, variable between 1 and 2; c, variable between 1, 2, and 3; n, character inapplicable; ?, missing character.

	5	10	15	20	25	30	35	40	45	50	53
<i>Zygorhiza</i>	00000	0000n	?000n	nn00n	n000n	00002	00000	00000	0n000	00000	?0?
<i>Cynthiacetus</i>	00000	0010n	?000n	nn00n	n000n	00002	01000	10000	0n000	00?00	000
<i>Agorophius</i>	??010	0?01n	00000	0000n	0?010	00000	?????	?0???	1000?	0????	???
<i>Eudelphis</i>	101?0	0?110	01??0	1?1?0	?????	?100?	1????	00???	?????	?0???	???
<i>Zygophyseter</i>	10110	01210	21101	12111	?1001	0110?	12?11	10101	100?0	0?2?0	11?
<i>Brygmophyseter</i>	??1??	0?210	21101	??1??	????1	01101	????1	101?1	?????	?????	??1
<i>Acro. deinodon</i>	20110	001?0	3?100	111?1	0??02	01101	?2011	10101	1??0?	01201	1??
<i>Acro. robustus</i>	??110	0?020	2110?	01101	01002	01101	????1?	10??1	10?00	01??1	?11
<i>Acrophyseter sp.</i>	00110	00120	?????	??1??	?????	0110?	?????	10?01	1?0??	01??1	???
<i>Livyatan</i>	21211	01320	2?1?0	?????	?1?12	01?0?	?????	10011	10?0?	1????	1??
<i>'Aulo.' rionegr.</i>	?0110	00110	11100	01110	0?011	01101	?????	??2?1	2001?	0????	???
<i>Orycterocetus</i>	10110	00110	11101	01110	1?011	11102	22011	012??	20?00	1011?	???
<i>Physeterula</i>	??10?	0?210	21101	??1?0	0??11	?1102	2????	0121?	?000?	?0???	1??
<i>Idiorophus</i>	00110	00210	?????	?????	????1	?????	?????	0121?	?0?0?	?????	???
<i>Diaphorocetus</i>	??110	0?120	?1101	11?0?	????1?	1110?	?????	??2??	20?1?	10???	???
<i>Placoziphius</i>	?0120	??110	?1101	11?10	??011	?110?	2????	?????	20???	?0???	?0?
<i>Aulophyseter</i>	10100	1n210	21101	02110	01022	21102	?201?	01???	200??	1010?	???
<i>Physeter</i>	a022a	1n310	31101	02110	01022	21102	22011	0121a	20011	10110	102
<i>Idiophyseter</i>	?????	1?1?0	2110?	121?0	????2	1???	?????	?????	?????	?????	???
<i>Thalassocetus</i>	?????	??010	1101?	????20	1??11	?1101	?????	?????	?011?	?????	???
<i>Aprixokogia</i>	??2?0	0?010	01111	021?0	?1121	01102	2????	?????	1110?	10???	???
<i>Scaphokogia</i>	?1111	1n020	01011	02120	?1121	?????	?211?	?????	21???	?????	???
<i>Praekogia</i>	?????	??021	0101?	??120	1?1?1	11011	2????	?????	?111?	10???	???
<i>Kogia</i>	21220	1n021	01011	0b120	11122	2101b	22111	01c1a	21112	10212	2?2