

## Towards non-invasive heart rate monitoring in free-ranging cetaceans: a unipolar suction cup tag measured the heart rate of trained Risso's dolphins

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Table S1. Instantaneous heart rates ( $f_H$ ) of three swimming trials of a Risso's dolphin (ID: gg\_mf) under operant conditions. Inactive periods, where the dolphin was motionless at the surface, prior to each swimming trial, are also shown. The dolphin followed a trainer who ran around the pen during swimming.

Trial date (dd/mm/yyyy)	Inactive		Swimming		Trial duration (min)
	$f_H$ (bpm)	Range (bpm)	$f_H$ (bpm)	Range (bpm)	
09/03/2019	48±18	33–75	63±24	28–111	13.8
12/03/2019	43±9	32–81	52±13	28–105	12.6
13/03/2019	47±11	30–73	63±21	28–108	12.7

Table S2. Instantaneous heart rates ( $f_H$ ) of motionless delphinids at the surface when pronounced sinus arrhythmia patterns were observed. Maximum and minimum  $f_H$  of inter-breath intervals (i.e. apneic periods) are shown (Mean ± S.D). See also Table 3 for summary of the experiments. Measurements were conducted from the end of October in 2019 until the beginning of November in 2019.

Species	ID	Fasting periods in the morning			Non-fasting periods in the evening		
		max. $f_H$ (bpm)	min. $f_H$ (bpm)	n*	max. $f_H$ (bpm)	min. $f_H$ (bpm)	n*
False killer whale	pc_km	50±4	22±2	5	70±3	40±3	8
Risso's dolphin	gg_sm	90±2	53±4	5	95±5	62±7	10
	gg_mf	70±6	34±4	10	78±7	37±6	10
	gg_nf	–	–	–	70±24	38±1	4
	gg_rm	93 ± 7	46±3	19	97±7	52±3	12

\* number of inter-breath intervals



Fig. S1. An example of past deployments of behavioural single-suction cup tag to a long-finned pilot whale. The size of the tag was slightly larger than that used in this study. The tag was deployed using a 6 m hand-pole.

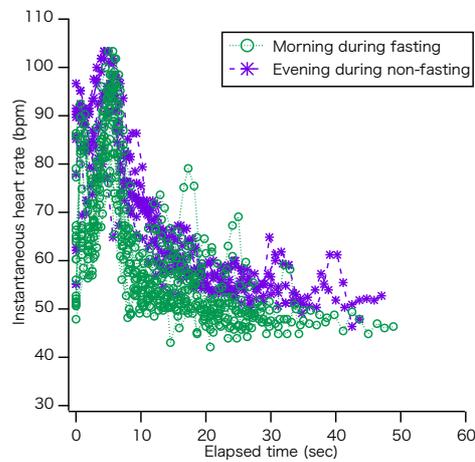


Fig. S2. The changes in heart rate from the end of each respiration to the next respiration when pronounced sinus arrhythmia patterns occurred (ID: gg\_rm). Variations in the instantaneous heart rates with respiration in the morning during fasting and in the evening during non-fasting are shown. See Table 3 for summary of the experiments of ID: gg\_rm.