

# Long-term vital measurements from subcutaneous data logger implantation in rhesus macaques (*macaca mulatta*)

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## BACKGROUND

- DST milli-HRT ACT
  - Data logger
  - Implanted subcutaneously
  - Less invasive procedure
  - [www.star-oddi.com](http://www.star-oddi.com) (Gardabaer, Iceland)

**STAR:ODDI**  
Logging Life Science



## SUBJECTS

- Used in single or group housed NHP
  - Males & females
  - Aged 8 – 28 years
  - Weighing 4kgs – 16kgs

• ≥ 8-month battery life

Continuous measurements

• Customized measurement frequency

Programmed intervals

• Heart Rate  
• Temperature  
• Activity level

Vital measures



Fig. 1: DST milli-HRT ACT data logger

## SURGICAL PLACEMENT

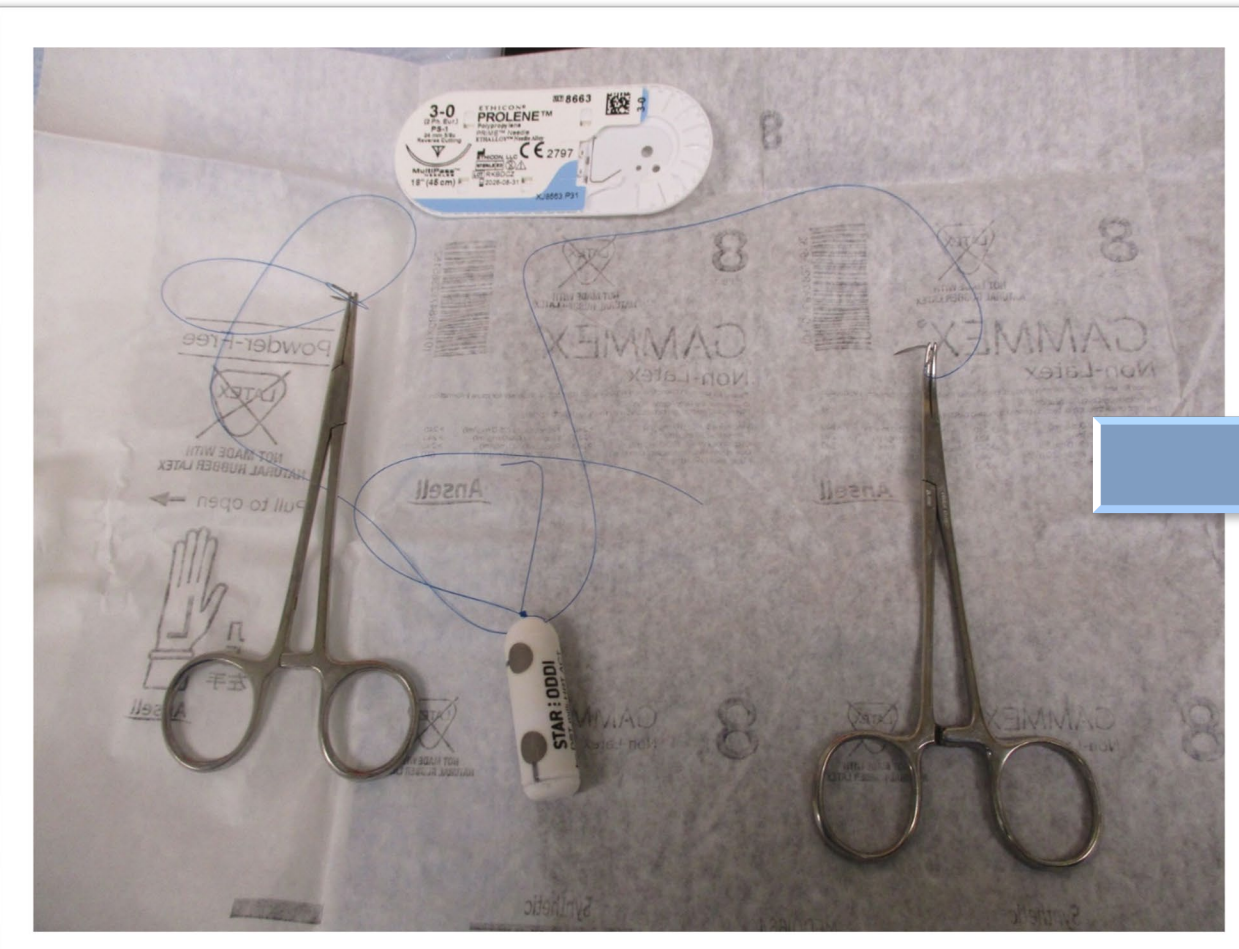


Fig. 3: DST milli-HRT ACT data logger surgical prep

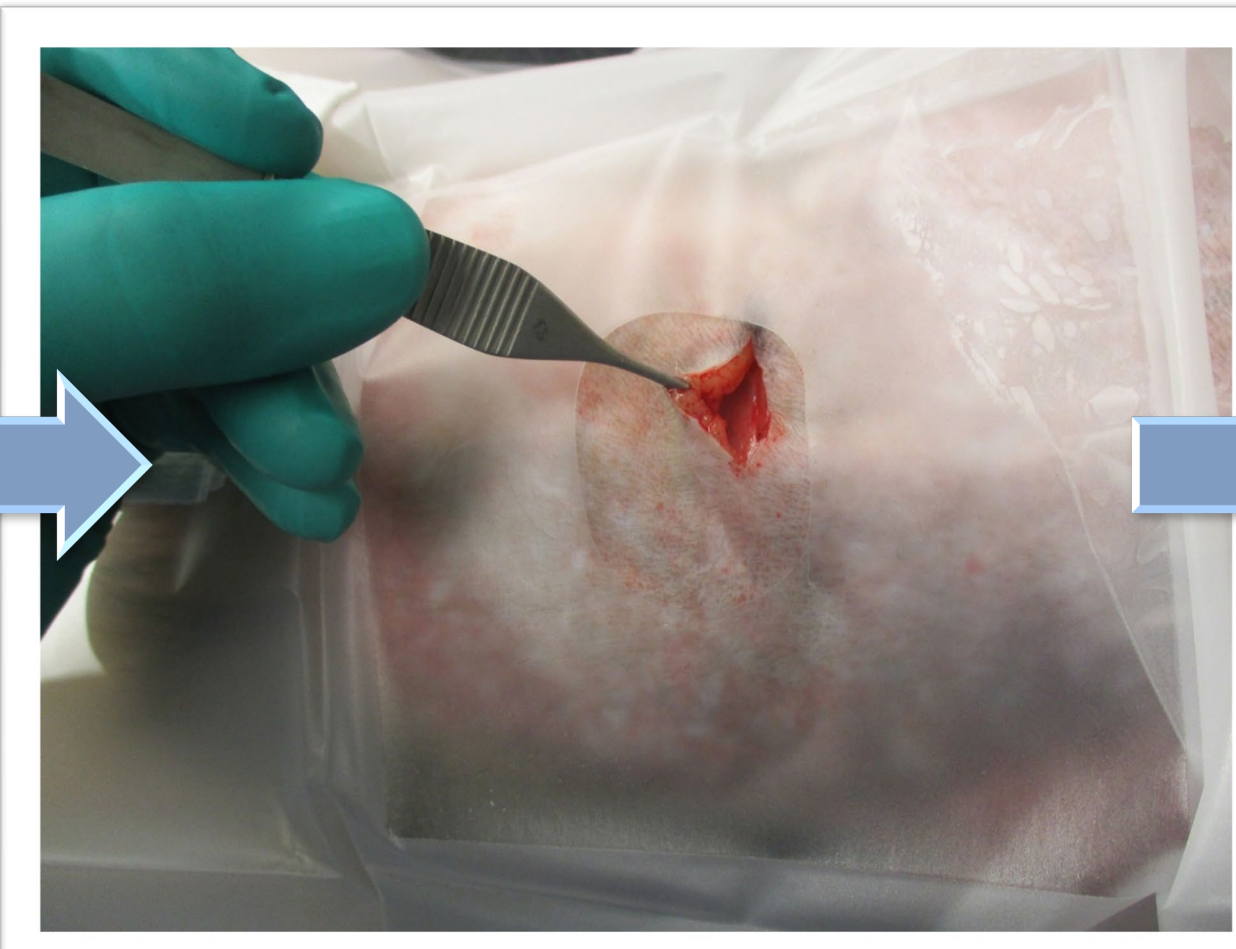


Fig. 4: A 3cm incision made on left lateral side of dorsal plane (implant close to heart)

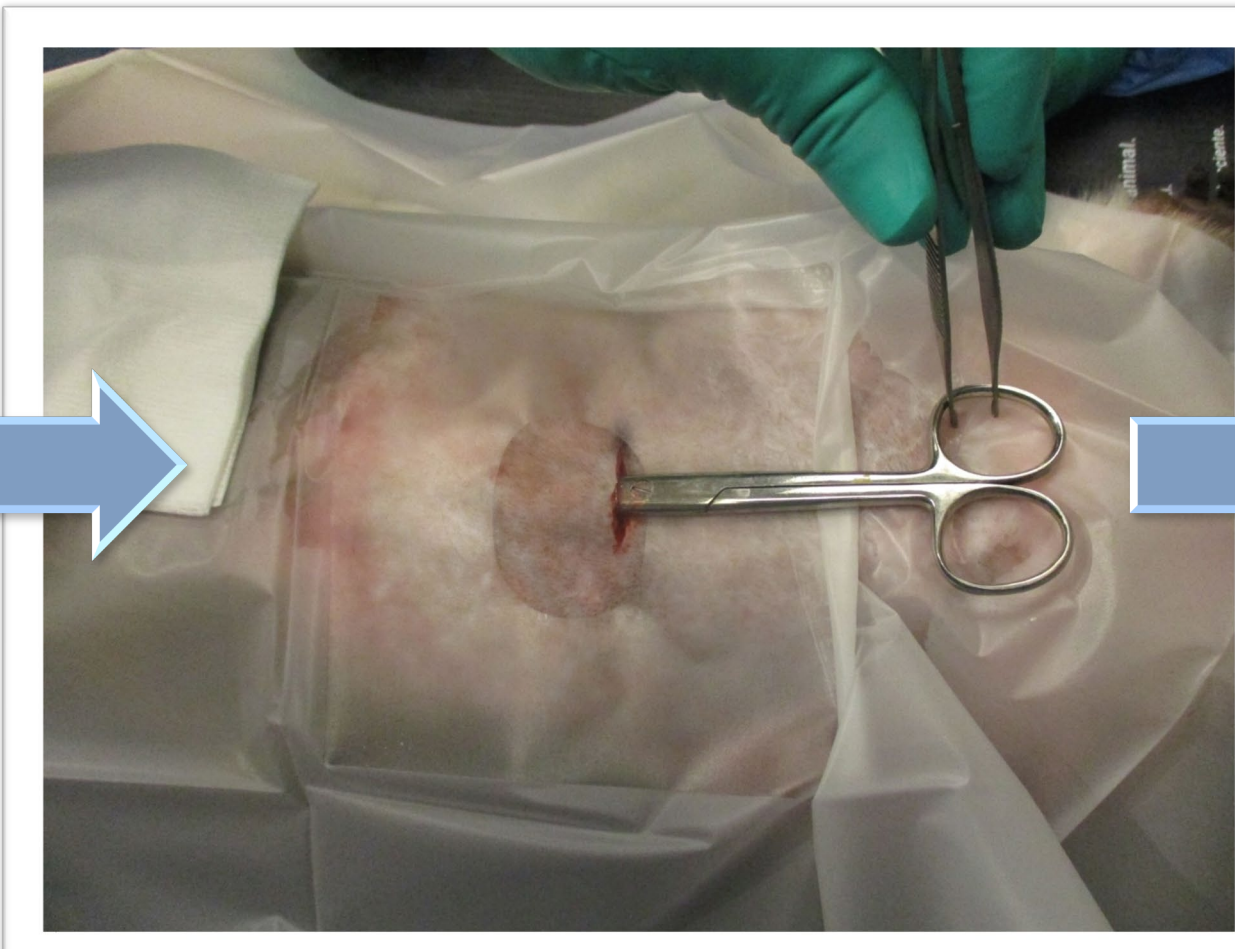


Fig. 5: Blunt dissection to create a pocket below the layer of SQ adipose tissue

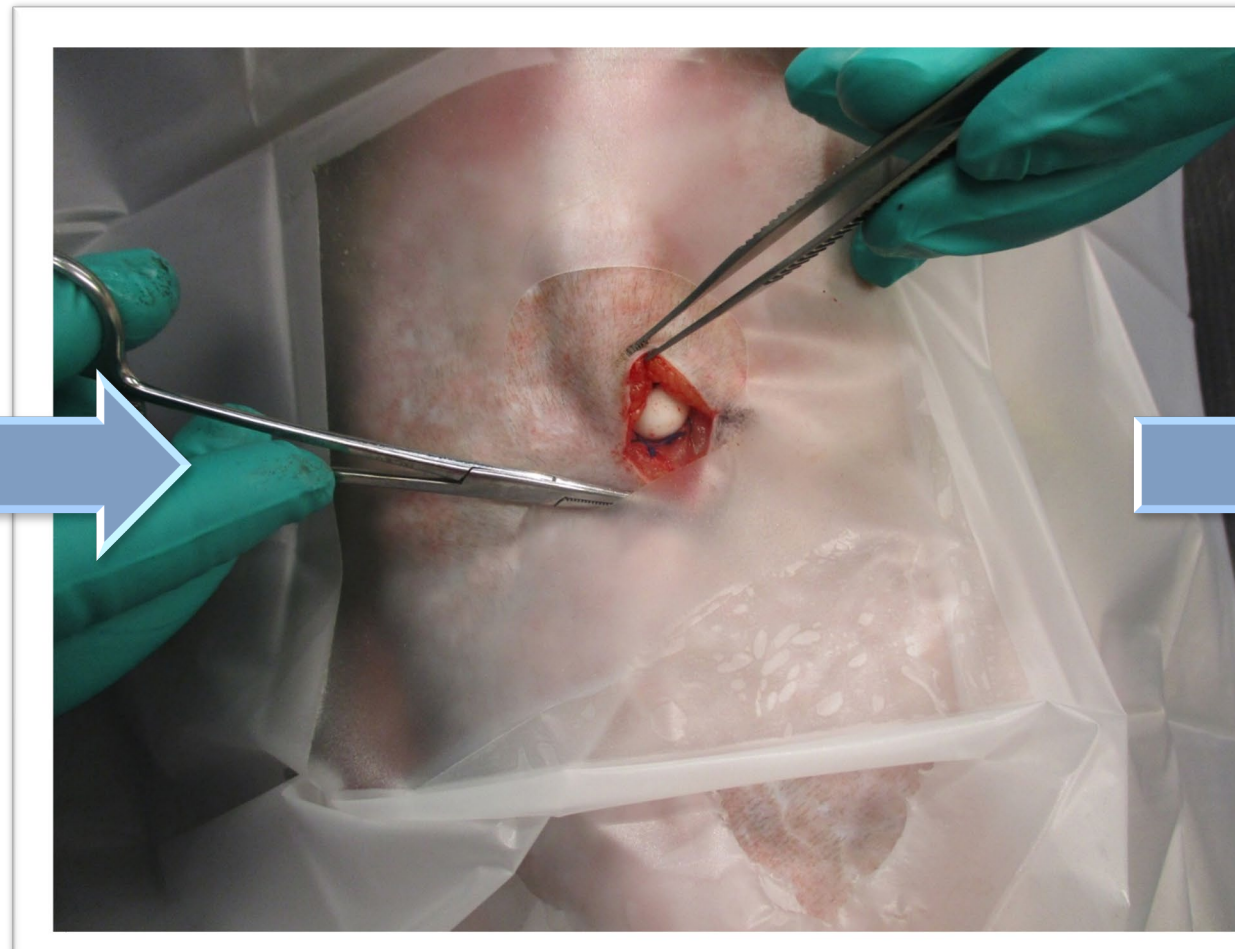


Fig. 6: Insert DST milli-HRT ACT data logger



Fig. 7: Two layers 3-0 PDS in a simple continuous pattern used to close the SQ tissue & skin



Fig. 8: VD Xray view of data logger placement



Fig. 9: Left lateral Xray view of data logger placement

## DATA OUTPUT

Number	Time	Temp(°F)	VAR(Minute)	ACT	MHEA(mg)	MaxEA(mg)	AvgEA(mg)	Skew	Kurt	HR(bpm)	QT
1	3/6/2023 6:00:00 AM	96.55	56.92	1	1	17	6	0.85	-0.96	113	0
2	3/6/2023 7:00:00 AM	98.15	361.34	1	0	105	12	2.93	9.42	159	1
3	3/6/2023 8:00:00 AM	98.45	397.20	1	0	107	14	2.85	8.56		
4	3/6/2023 9:00:00 AM	99.56	8757.72	2	0	445	100	1.52	2.65	196	0
5	3/6/2023 10:00:00 AM	99.76	2374.34	2	1	218	35	2.08	3.84	154	1
6	3/6/2023 11:00:00 AM	99.35	11086.53	2	1	457	133	1.18	1.04		
7	3/6/2023 12:00:00 PM	99.35	64.01	1	0	40	6	2.75	7.72	127	0
8	3/6/2023 12:10:00 PM	99.35	15.60	1	1	22	7	1.21	2.74	105	0
9	3/6/2023 12:30:00 PM	98.95	508.58	1	0	129	16	3.04	10.52	133	0
10	3/6/2023 12:30:00 PM	99.56	1233.59	2	0	226	16	4.58	21.90		
11	3/6/2023 12:40:00 PM	99.56	411.19	1	0	115	8	4.78	22.10	188	0

Table 2: Extrapolated data shown via Star-Oddi application software, Mercury

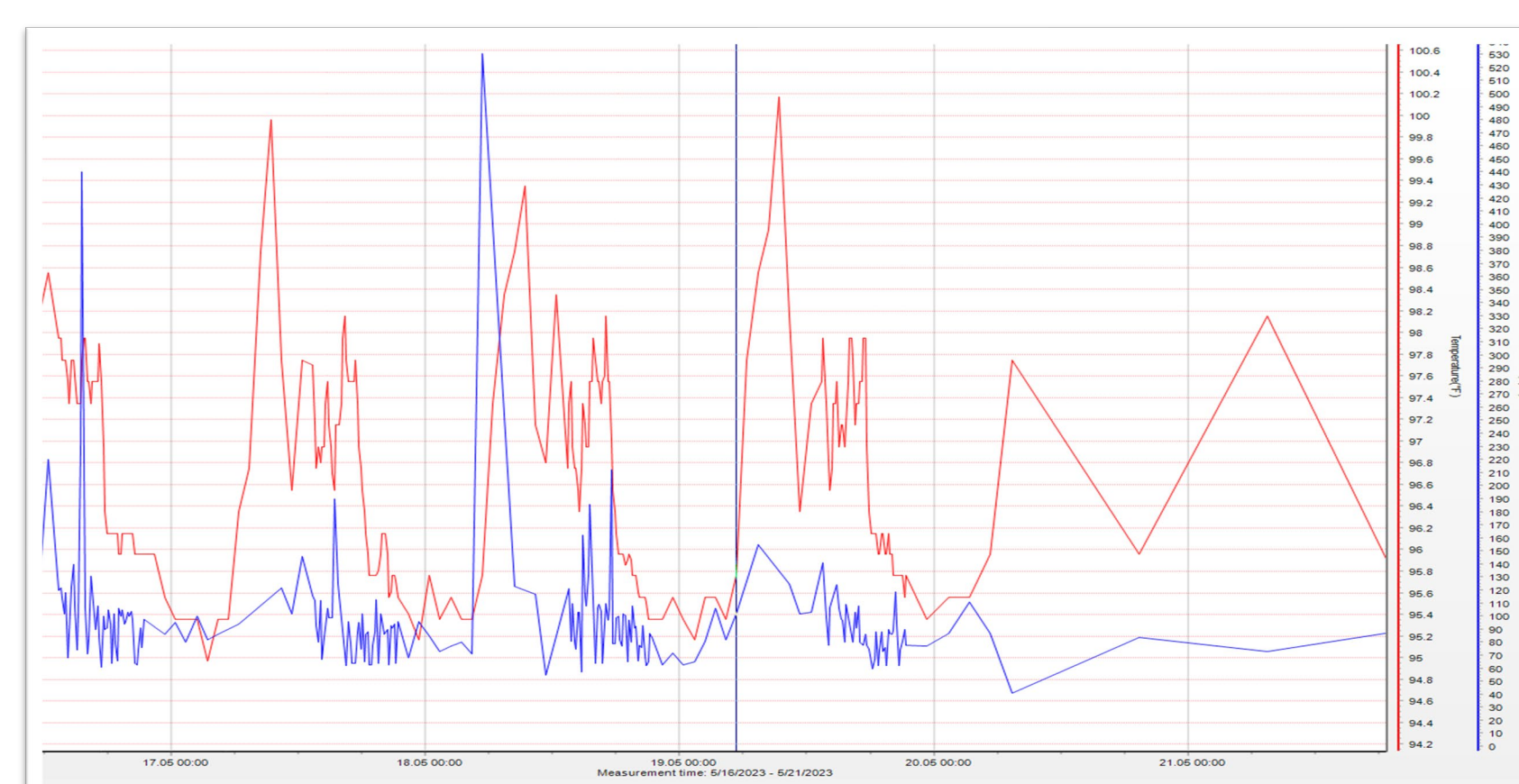


Table 3: Heart rate (bpm) and temperature (°F) data over 5-hour period

Loggers are reusable

Sterilized at low temp

Quality Interval (QI) ratings

Programming options almost unlimited (interval & duration)

No maintenance required while active

**PROS**



**CONS**

Battery life correlated to volume of data

Challenging to set parameters, requires experience

Data obtained only after surgical removal

No way to ensure it is working while implanted

Volume of activity data can be overwhelming

Table 1: Pros and cons of subcutaneous data logger implants

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