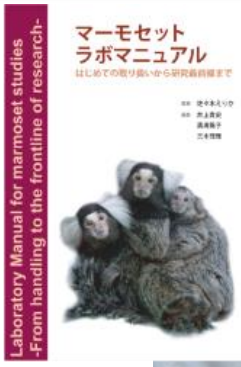
Current state of marmoset population in Japan and exchange of the marmoset genetic resources

Erika Sasaki
Central Institute for Experimental Animals

CIEA
SINCE 1952

History of marmoset research in Japan

日本マーモセット研究会
Japan Society for Marmoset Research



2018 Marmoset lab manual

2016 Knockout marmoset by genome editing

2014 Brain/MINDS project

2012 Japan Society for Marmoset Research

2011 New marmoset facility, Tonomachi

2010 Establishment of iPS cell lines

2009 Development of transgenic marmoset

2008 Strategic Research Program for Brain Sciences

2005 Establishment of ES cell lines
Disease models : Parkinson's diseasese (MPTP), spinal cord injury

1996 Marmoset Handbook, Tanioka et al.
Transfer breeding colony to CLEA Japan Inc.

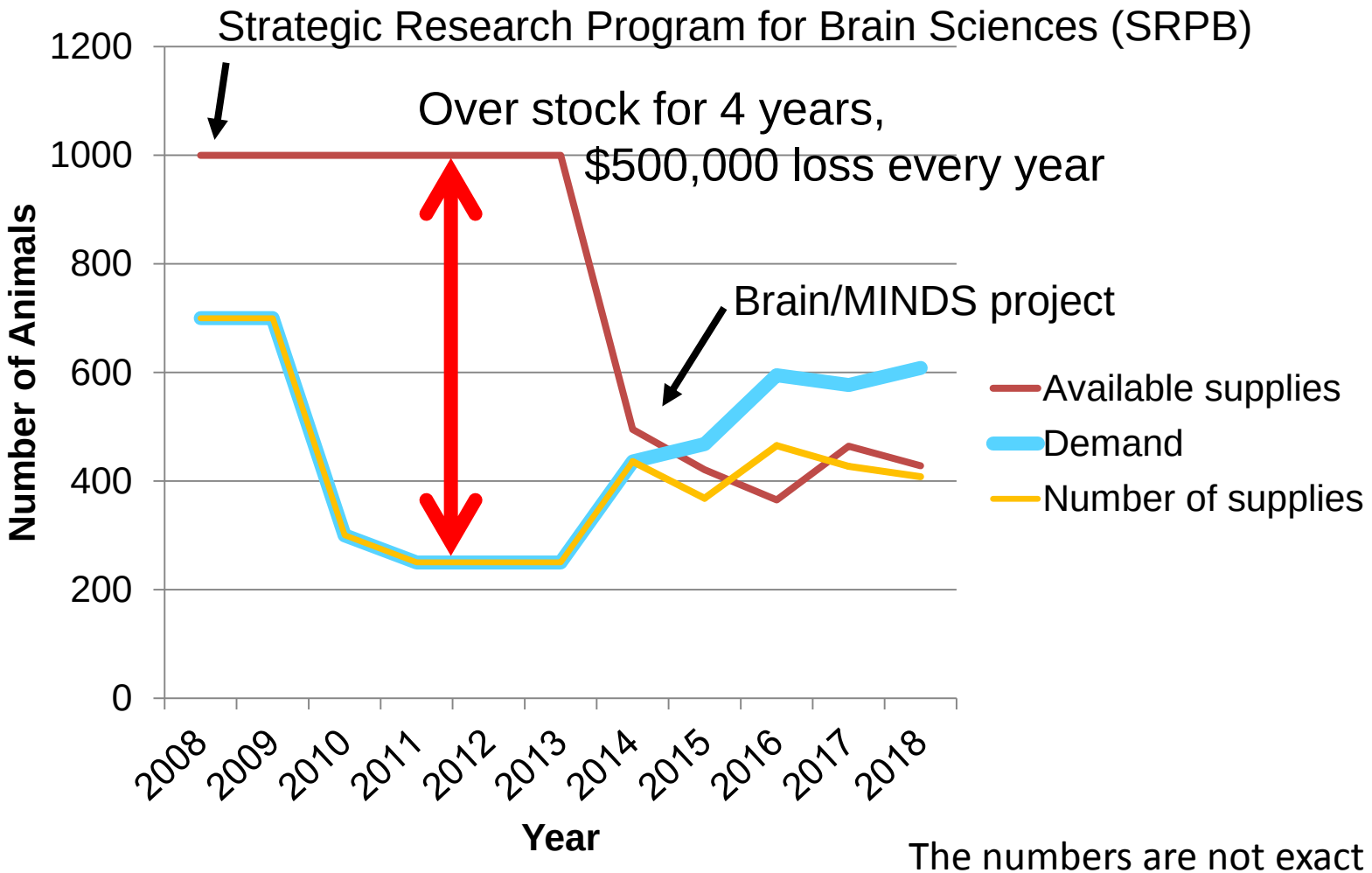
1989 Characteristics and Experimental use of the common marmoset, Tanioka et al.

1983 60 marmosets have been introduced from ICI (UK).

1981 Although 40 common marmosets were introduced from ICI, 30 were dead.

1978 Investigation of 12 kindss of small primates toward developing non-human primate models.

Image of the Marmoset demands and supplies in Japan



The numbers are not exact

Courtesy of Mr. Fukasawa, CLEA Japan, Inc.

Transportation of marmosets

In Japan, marmoset is prohibited to import from France

This animal transportation difficulties make less genetic diversity in individual colonies

Shipping embryos (or sperm) using dry shippers

FedEx®

ヤマト運輸

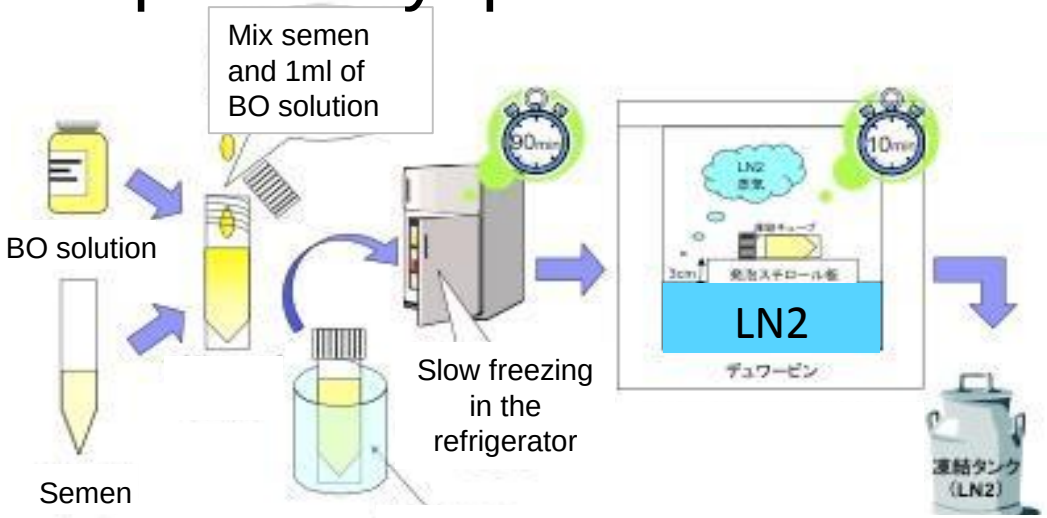
World Courier
AmerisourceBergen

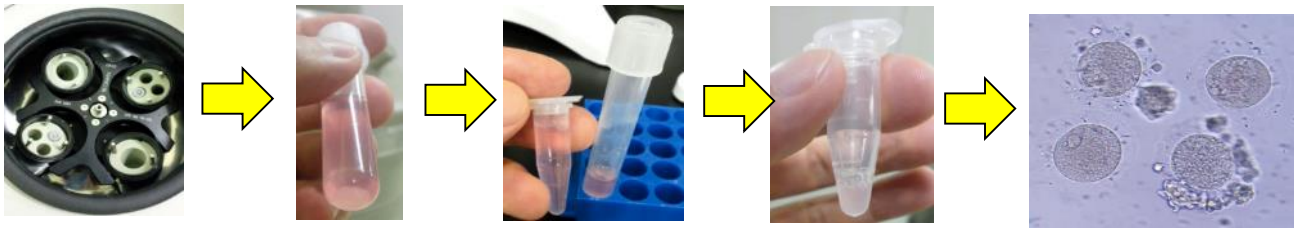
ups®

“**dry shippers**” are designed to safely transport a variety of materials at cryogenic temperatures.

Don’t forget to get Export / Import approves for CITES before shipping !!

Sperm Cryopreservation





Centrifugation 400Xg for 3min

Sperm swim-up

Suspend in 1mM dbcAMP+BO

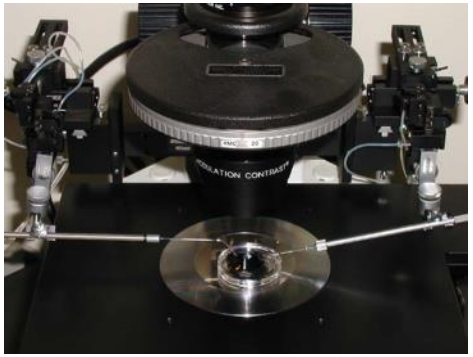
IVF

	dbcAMP treat	Number of trals	Number of oocytes	Number of fertilized embryos	Fertilization rate
Flesh	-	11	72	34	**47.2** %
Cryopreserved	-	3	10	0	**0** %
	+	7	36	8	**22.2 %**

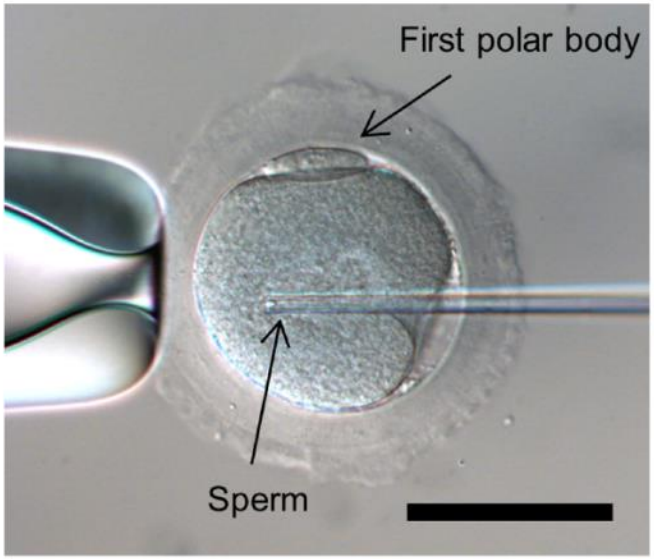
Intracytoplasmic sperm injection (ICSI) is needed to obtain fertilized embryos

Courtesy of Prof. Sotomaru

ICSI requires special equipment and technics



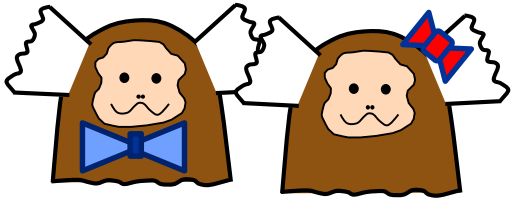
Micro manipulator



Furthermore, ovarian stimulations, surgical ovum pickup procedures are also required

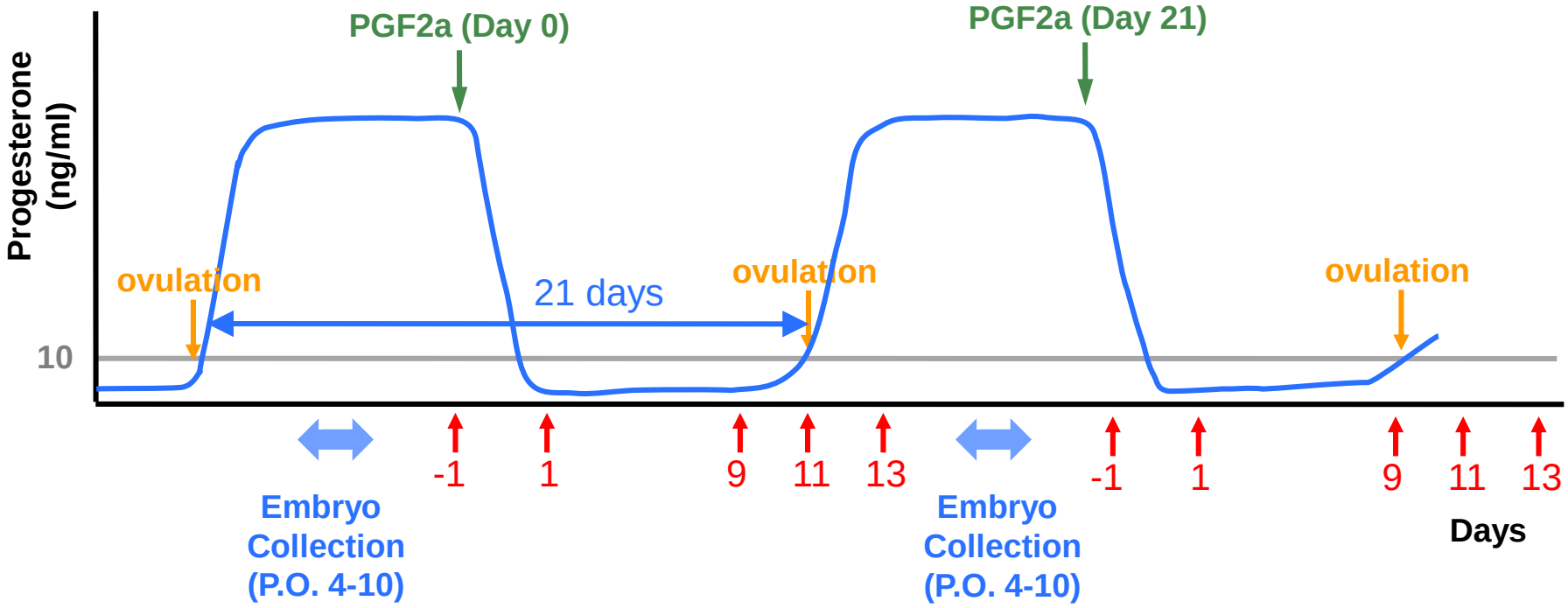
In vitro manipulated embryos are low efficiencies of cryopreservation….

Natural fertilized embryo collection



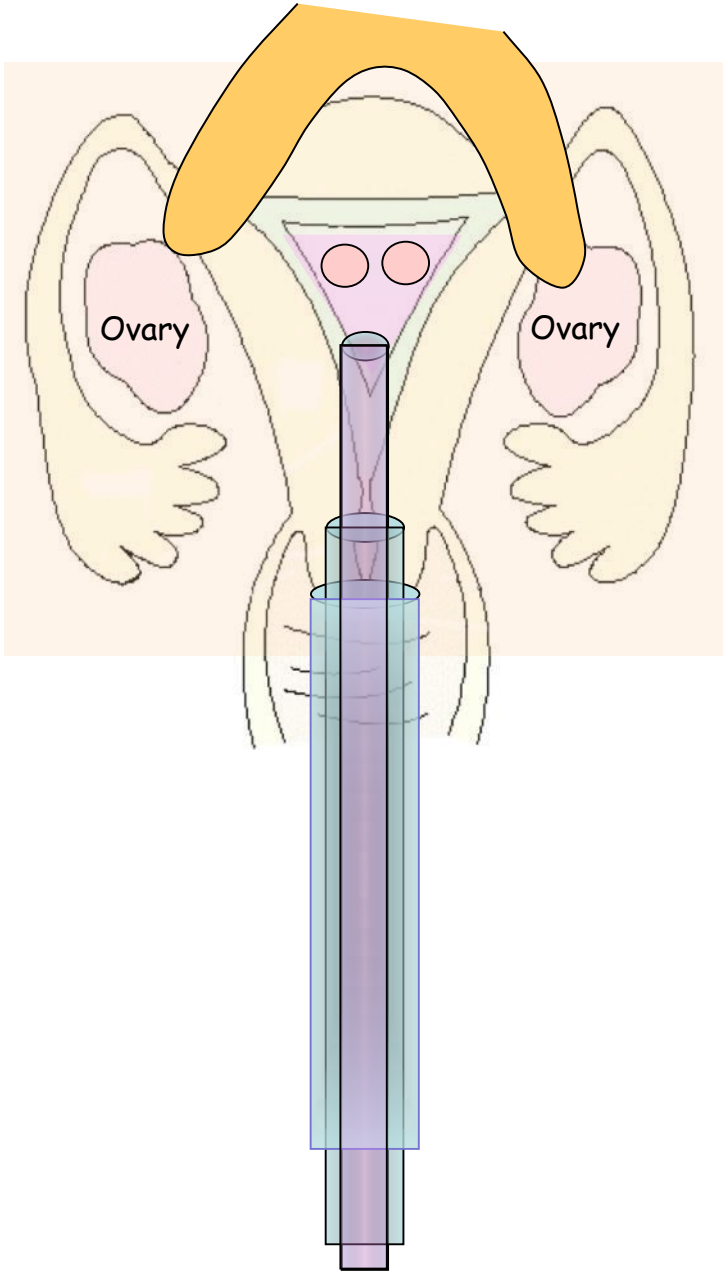
Paired marmosets

ovarian cycles controls using PGF2α



Blood or urine sample collection on Day -1, 1, 9, 11, 13

Nonsurgical embryo collection



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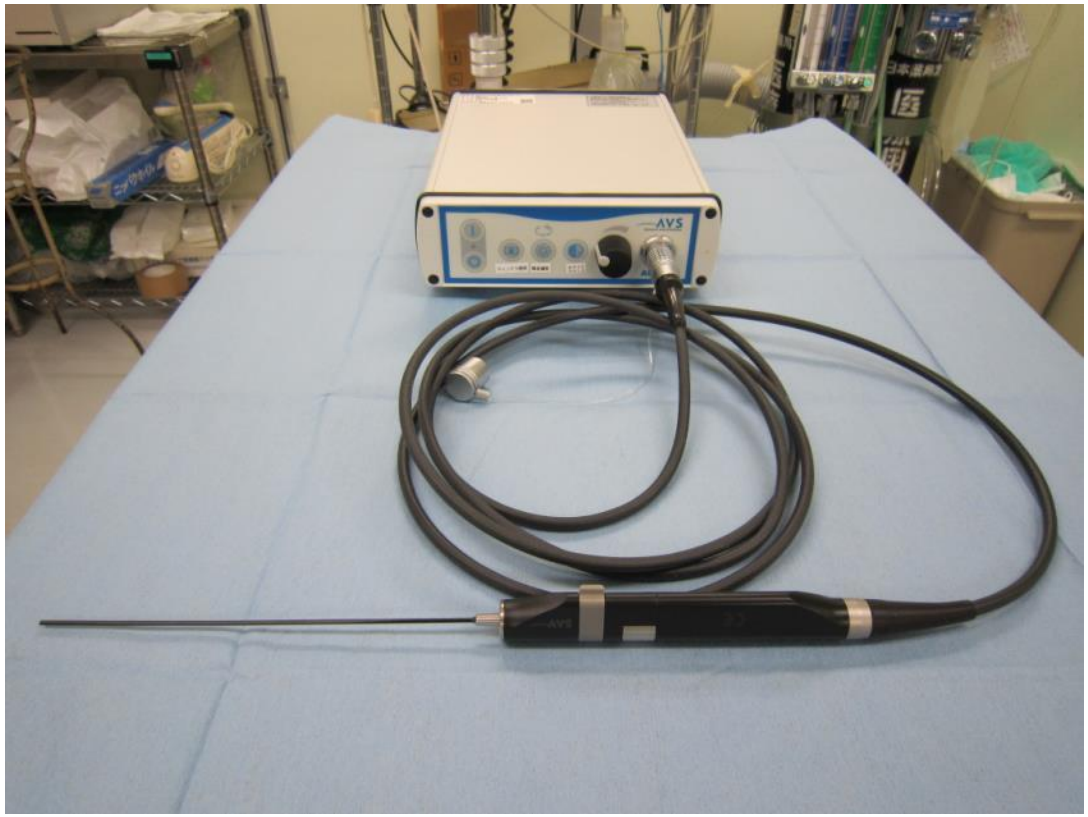
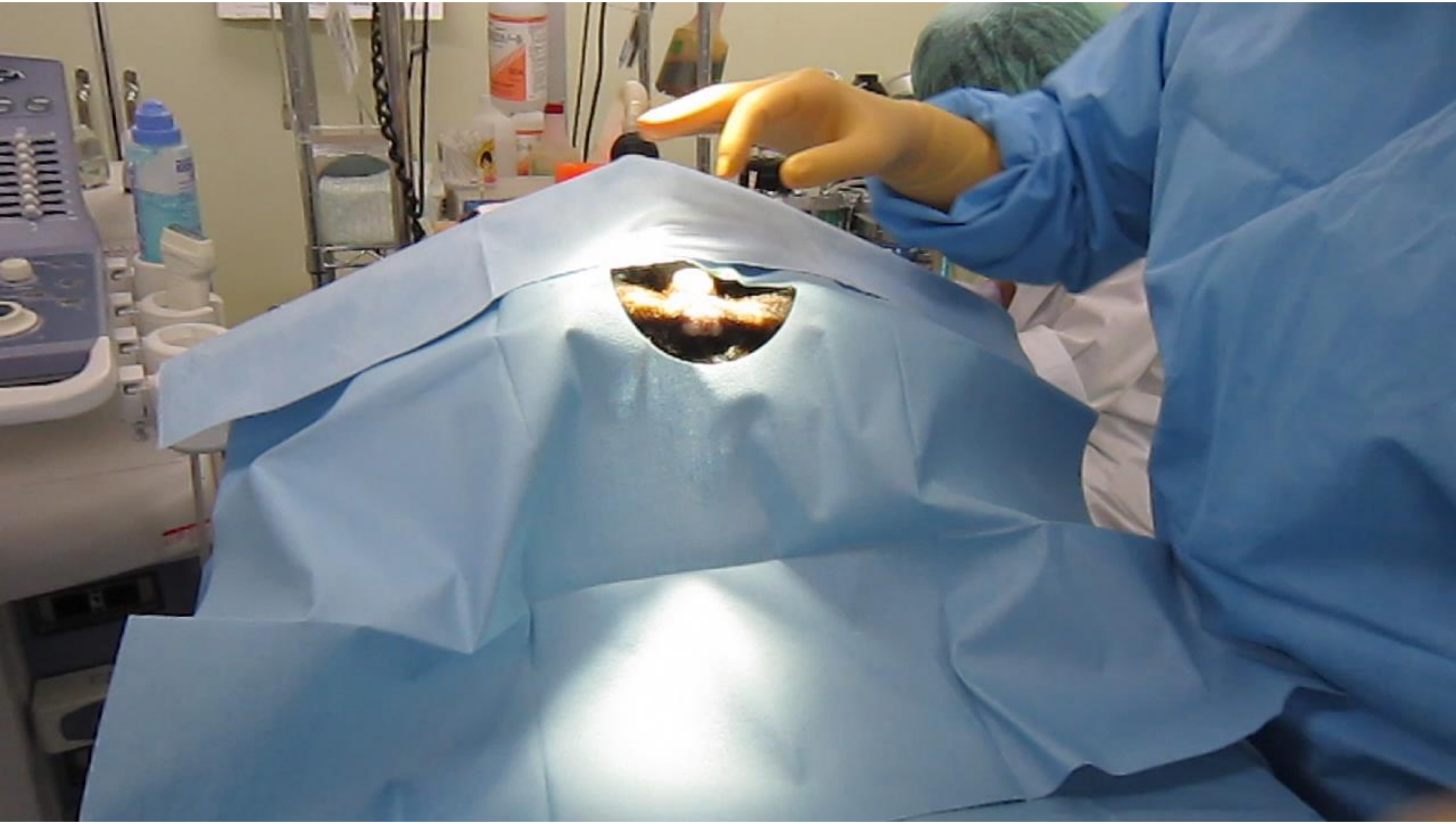
Nonsurgical uterine stage preimplantation embryo collection from the common marmoset

Thomson JA, Kalishman J, Hearn JP. Nonsurgical uterine stage preimplantation embryo collection from the common marmoset. J Med Primatol 1994:23:333–336

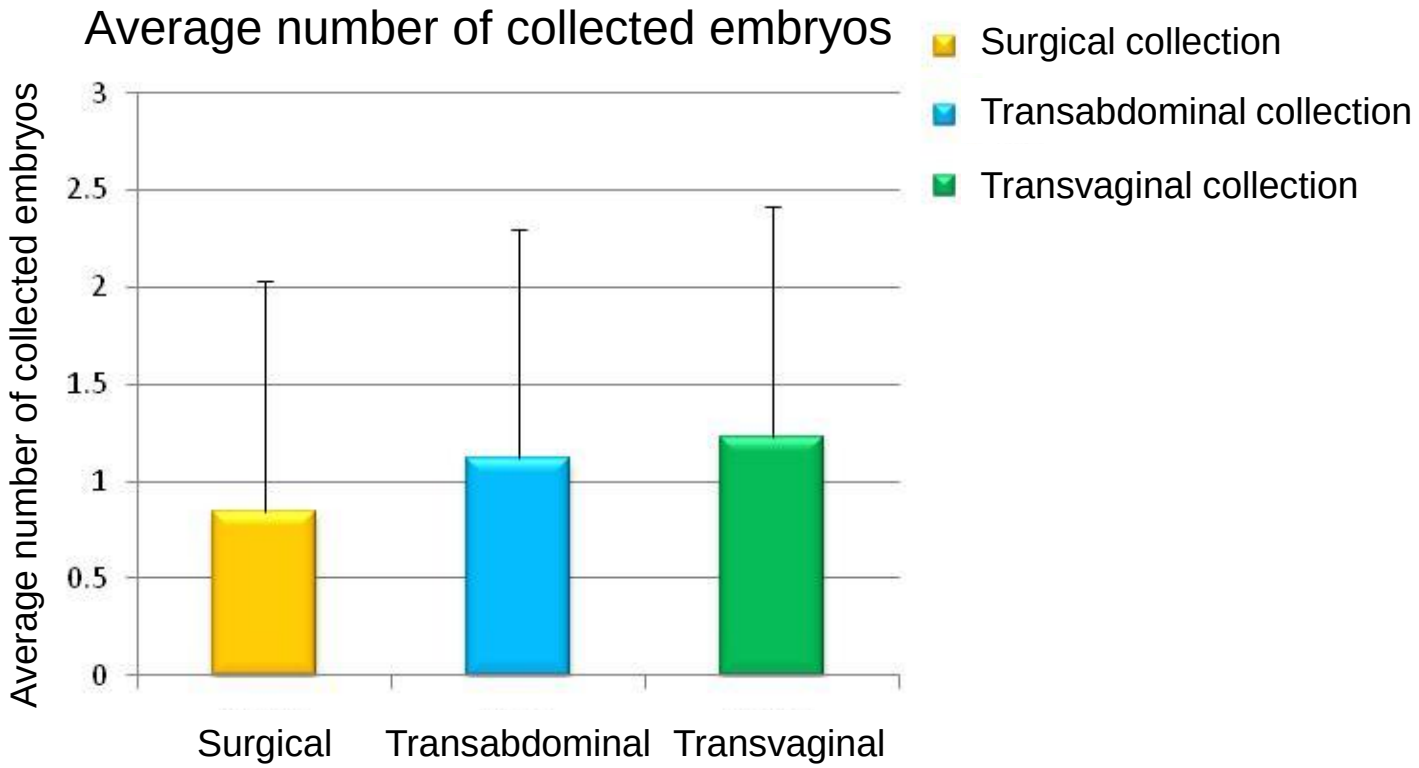
J.A. Thomson,[1,2]
J. Kalishman,[1,2]
J.P. Hearn[1]

Thomson et al. J Med Primatology 1994



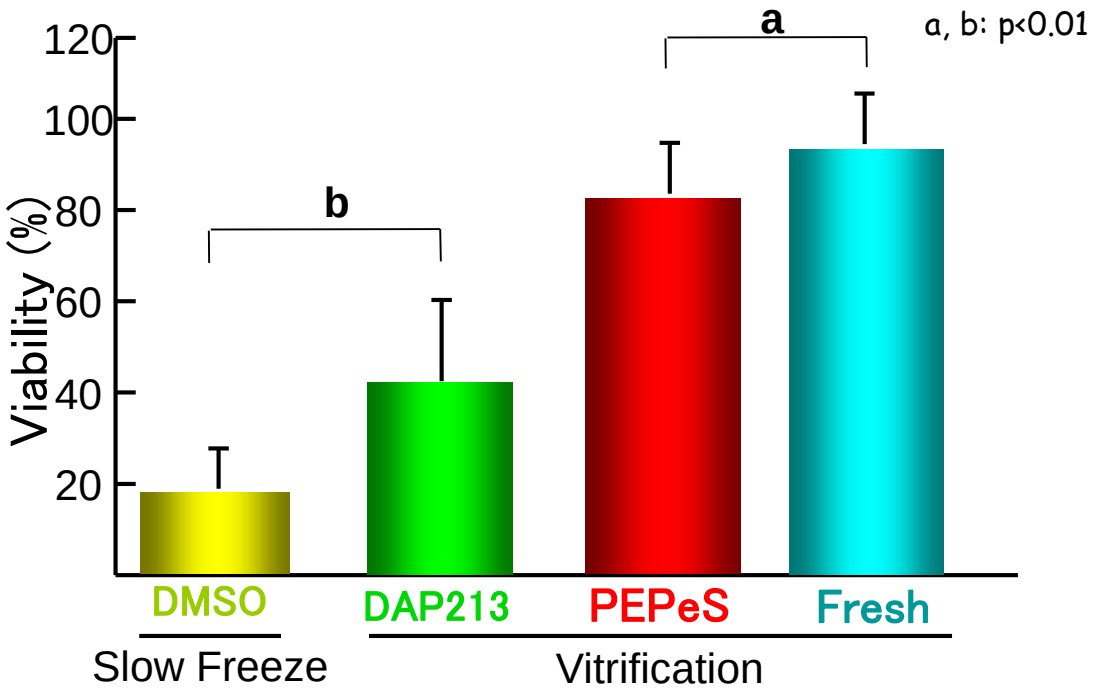


Comparison of successful rates among the embryo collection methods

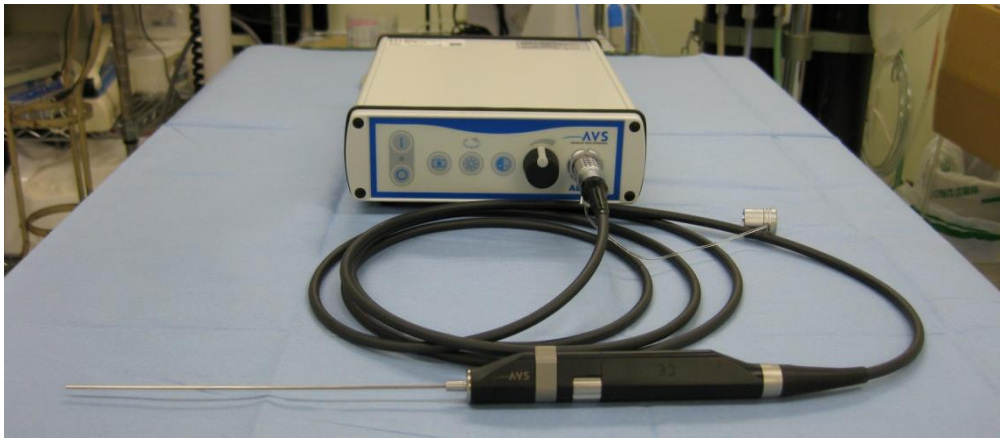


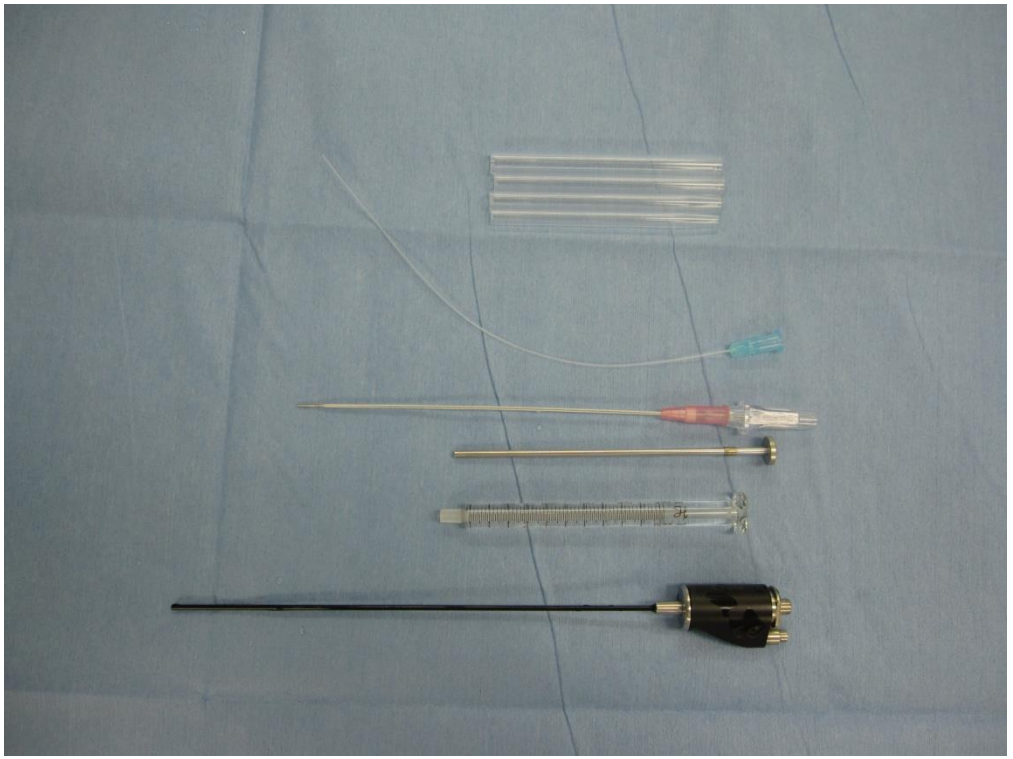
	Number of times of collection	Times of successful collection	Number of collected embryos	Number of Abnormal embryos	Rates of successful collection	Average number of collected embryos
Surgical	52	22	44	0	42.3%	0.85
Percutaneous	52	28	58	3	53.8%	1.1
Transvaginal	52	33	64	3	63.5%	1.2

Vitrification of marmoset embryos and viability after thawing

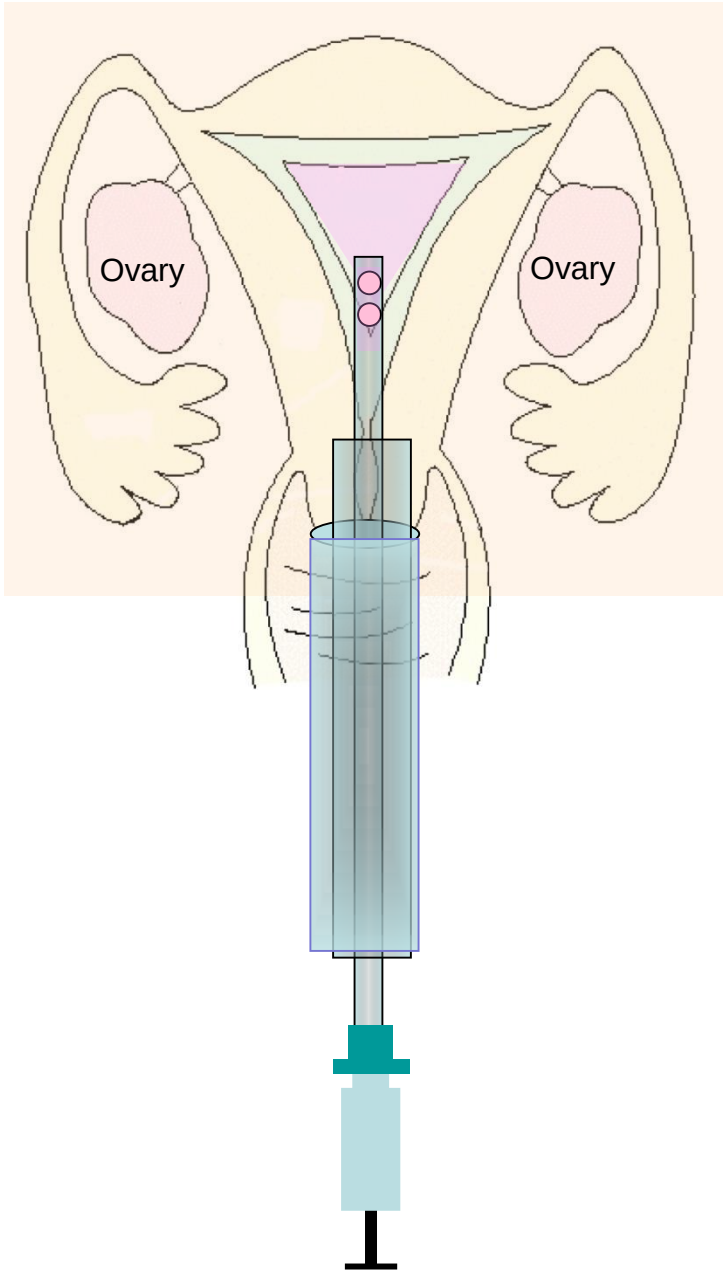


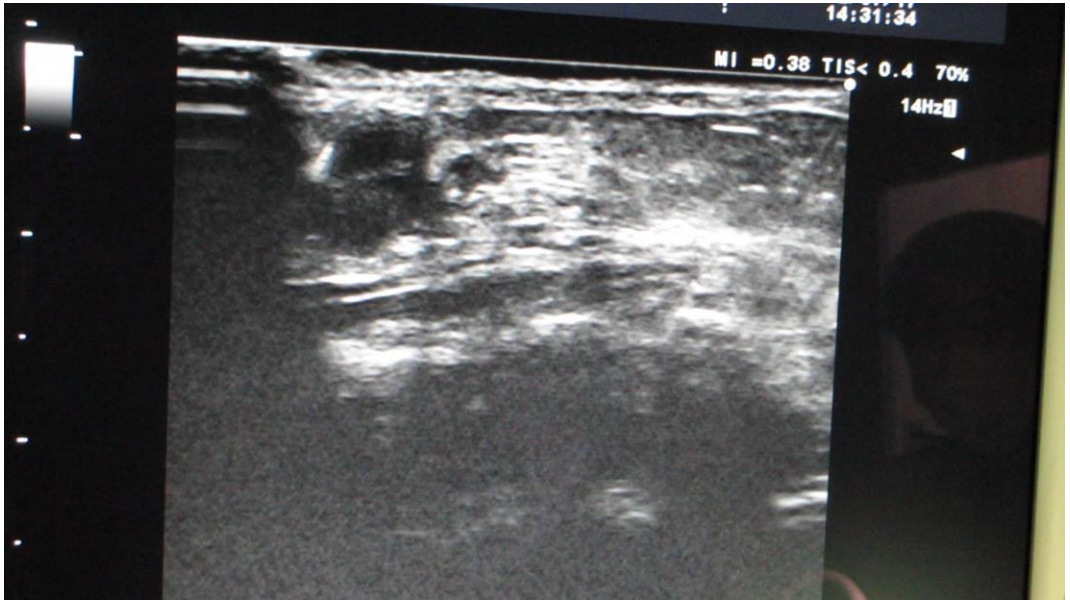
Nonsurgical embryo transfer





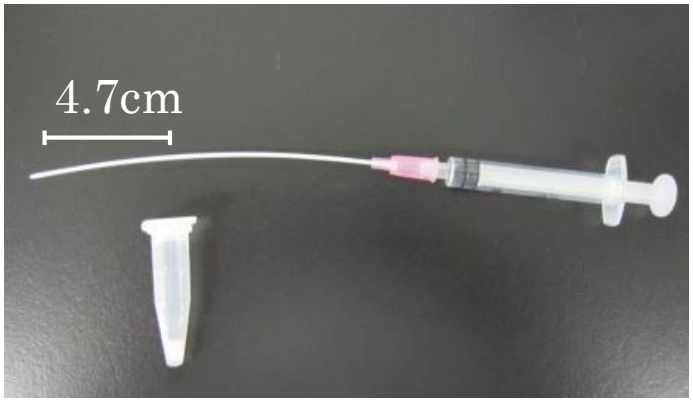

prosound
SONY


Ovary
Ovary


14:31:34
MI =0.38 TIS< 0.4 70%
14Hz

Artificial insemination in marmoset

Semen collection



50μl TYH＋semen

Developed AI method without anesthesia

Fertilization	Number of		
	Embryo collection traial	unfertilized embryo	Fertilzed embryos
Natural mating	13	24	0
AI	10	4	8

Currently, only fresh semen can be applicable for this method

Acknowledgements

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