

---

# AMH NEL LABORATORIO DI EMBRIOLOGIA CLINICA

04/02/2020

---

Il Laboratorio di Embriologia è il luogo in cui avviene la fecondazione *in vitro* in senso stretto

Nel Laboratorio lavorano

Biologi

Biotecnologi

che si occupano di Medicina della Riproduzione, ovvero gli

**Embriologi**

## *IVF Lab*



*Centro di Fisiopatologia della Riproduzione Umana – Ospedale del Delta, AUSL di Ferrara*

## *IVF Lab*



*Centro di Fisiopatologia della Riproduzione Umana – Ospedale del Delta, AUSL di Ferrara*

Analisi del liquido seminale

Prelievo e selezione degli ovociti

ICSI

Coltura embrionale

Selezione degli embrioni

Transfer

Criogenia

Analisi del liquido seminale

**Prelievo e selezione degli ovociti**

ICSI

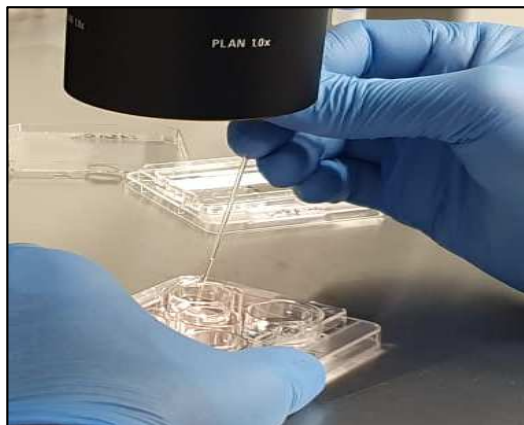
Coltura embrionale

**Selezione degli embrioni**

Transfer

Criogenia

# *IVF Lab*



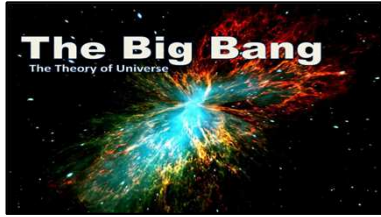
---

**1978**



Nobel per la scoperta del Big  
Bang

1978



Nobel per la scoperta del Big Bang



Primo online exchange forum

**1978**



Nobel per la scoperta del Big Bang

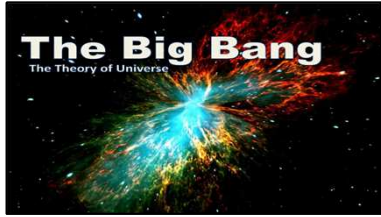


Primo online exchange forum



Invenzione del Walkman

**1978**



Nobel per la scoperta del Big Bang

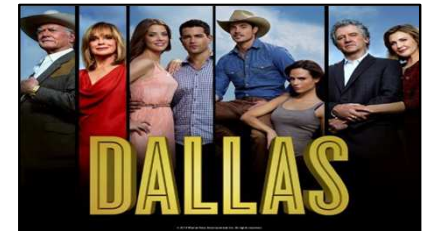


Primo online exchange forum

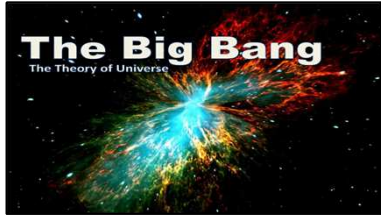


Invenzione del Walkman

# 1978



Primo episodio di Dallas



Nobel per la scoperta del Big Bang



Primo online exchange forum

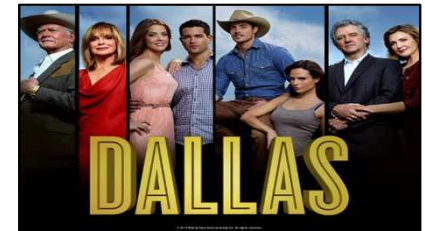


Invenzione del Walkman

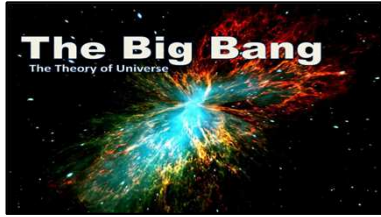
# 1978



Rapimento di Aldo Moro



Primo episodio di Dallas



Nobel per la scoperta del Big Bang



Primo online exchange forum



Invenzione del Walkman

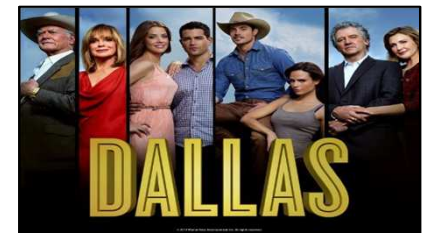
# 1978



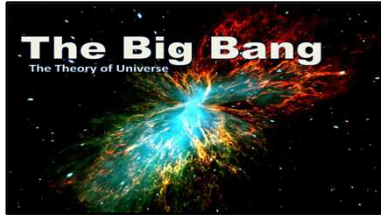
Nascita dal SSN italiano



Rapimento di Aldo Moro



Primo episodio di Dallas



Nobel per la scoperta del Big Bang



Primo online exchange forum



Invenzione del Walkman

# 1978



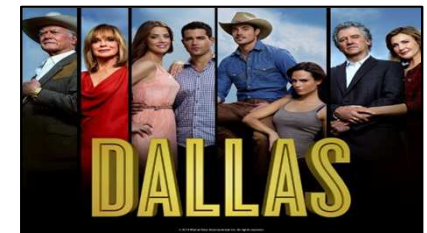
Louise Brown  
*“the first test tube baby”*



Nascita dal SSN italiano



Rapimento di Aldo Moro



Primo episodio di Dallas



1981  
Stimolazione ovarica  
(Alan Trounson)



1983  
Gravidanza da  
embrioni congelati  
(Alan Trounson)



1986  
Parto da  
ovociti congelati  
(Christopher Chen)



1987  
Vitrificazione  
(Michael Taylor)



1992  
ICSI  
(Giampiero Palermo)



2004  
Primo nato da  
tessuto ovarico congelato  
(Kutluk Oktay)



2010  
Nobel per la Medicina  
(Robert Edwards)



2013  
Validazione della  
vitrificazione degli ovociti  
(ASRM)

---

Nonostante il rapido progresso, la Medicina della Riproduzione porta con sè una sfida nata con la fecondazione *in vitro*:

**la scelta degli embrioni con maggiore possibilità di impianto**



*“Il tasso di crescita cellulare in relazione ai giorni di coltura e le caratteristiche morfologiche dell’embrione sono fattori determinanti nella scelta dell’embrione da trasferire”*

(Robert Edwrad, 1984)

---

Il principale obiettivo per l'Embriologo del 2020 è individuare gli ovociti e gli embrioni competenti

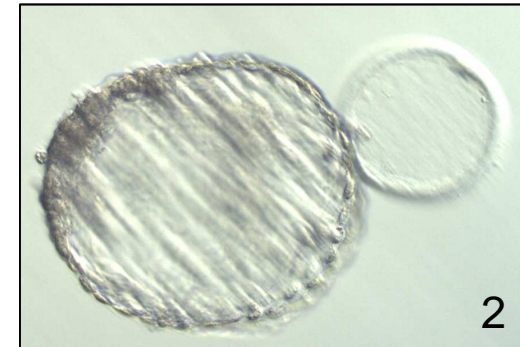
**Ovocita competente:**

in grado di essere fecondato *in vitro* e di originare un embrione

**Embrione competente:**

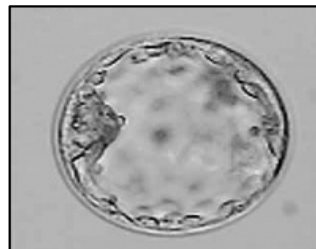
in grado di evolvere *in vitro* e di originare una gravidanza

*Quale scelgo?*



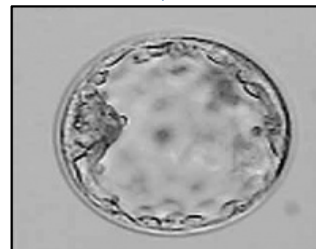
*Quale scelgo?*

---

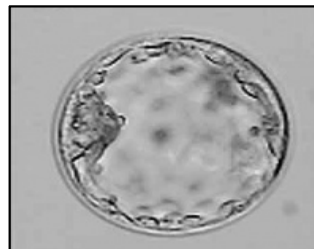


*Quale scelgo?*

---



## *Quale scelgo?*



<b>Età femminile</b>	<b>Euploidia embrionaria</b>
< 35 anni	65-70%
> 42 anni	< 10%

La maggior parte degli embrioni selezionati per il trasferimento in utero sono aneuploidi

**Tabella 3.4.28: Distribuzione delle gravidanze e delle percentuali di gravidanza su cicli iniziati e su prelievi effettuati da tecniche a fresco, secondo la tecnica utilizzata secondo le classi di età delle pazienti nell'anno 2017**

Classi di età delle pazienti	Gravidanze		% di gravidanze su cicli iniziati		% di gravidanze su prelievi effettuati		% di gravidanze su trasferimenti effettuati	
	FIVET	ICSI	FIVET	ICSI	FIVET	ICSI	FIVET	ICSI
≤ 34 anni	604	2.931	26,7	23,5	29,3	25,2	38,9	36,1
35-39 anni	671	3.287	21,1	19,4	23,3	21,1	29,7	29,8
40-42 anni	254	1.290	12,5	11,4	14,3	12,8	18,8	18,4
≥ 43 anni	38	235	6,5	5,6	7,7	6,8	10,5	10,8
<b>Totale</b>	<b>1.567</b>	<b>7.743</b>	<b>19,5</b>	<b>17,2</b>	<b>21,8</b>	<b>19,0</b>	<b>28,4</b>	<b>27,4</b>

Il fatto di non potere selezionare accuratamente gli ovociti e gli embrioni competenti rende la PMA poco efficace

---

L'efficacia della PMA può aumentare trasferendo più embrioni

Ciò però comporta anche l'aumento del rischio di gravidanza multipla



*“The ultimate goal of IVF is to achieve healthy single live birth following each single embryo transfer in a shortest time”*

---

**AMH può essere utilizzato come marker di competenza ovocitaria ed embrionaria?**

---

La prima informazione che AMH può dare ad un Embriologo è legata al numero di ovociti che la paziente produrrà

Esistono numerosi studi che dimostrano una correlazione lineare tra le concentrazioni sieriche di AMH e il numero di ovociti recuperati

**AMH può essere anche un marker di qualità (competenza), oltre che di quantità?**

Dato che la quantità degli ovociti indica talvolta anche la loro qualità, è possibile che AMH possa essere in marker indiretto di qualità

## *Markers di competenza*

---

Studio morfologico dell'ovocita

Studio morfologico dello zigote

Studio morfologico dell'embrione

Studio morfocinetico dell'embrione

Studio genetico dell'embrione

Studio biochimico del fluido follicolare???

AMH???

## *Studio morfologico dell'ovocita*

---

Permette di valutare:

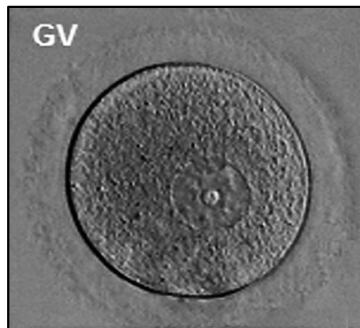
- Maturità nucleare
- Maturità citoplasmatica
- Anomalie extracitoplasmatiche

In un ovocita competente, la maturazione nucleare e quella citoplasmatica dovrebbero essere coordinate

La asincronia di questi due eventi può generare anomalie morfologiche e perdita di competenza ovocitaria

## *Studio morfologico dell'ovocita*

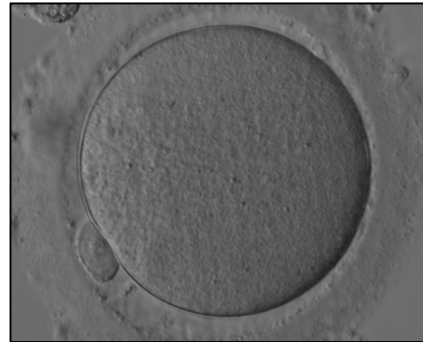
L'analisi della maturità nucleare è oggi standardizzata



profase I



metafase I

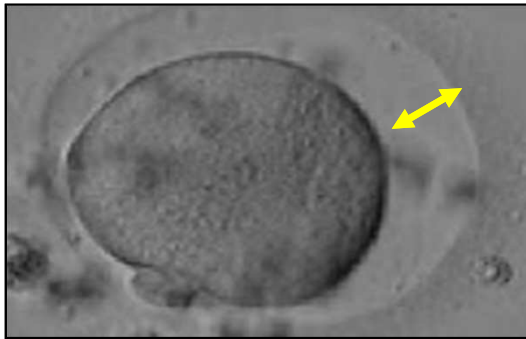


metafase II

## *Studio morfologico dell'ovocita*

---

Gli unici indicatori morfologici di competenza ovocitaria sembrano essere:



Spazio perivitellino anomalo



Vacuoli > 14 micron



SER

## *Studio morfologico dello zigote*

---

Lo zigote è il primo risultato della fusione dei gameti

Si origina  $17 \pm 1$  ore dalla inseminazione

GLUBULI POLARI

PRONUCLEI

NUCLEOLI



Le configurazioni di queste tre componenti sarebbero indicatori di competenza

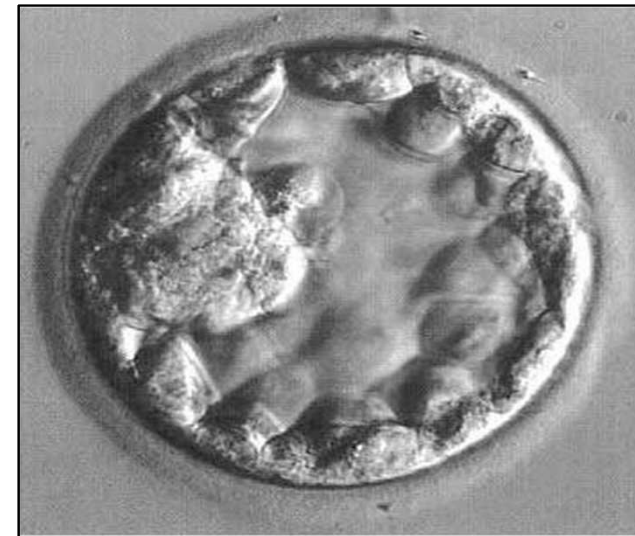
## *Studio morfologico dell'embrione*

Embrione “*cleavage stage*”  
(II-III giornata)



- Numero di cellule
- Frammentazione
- Simmetria
- Nucleazione

Blastocisti  
(IV-VI giornata)



- Espansione blastocelica
- Trofotoderma
- Inner Cell Mass (ICM)

---

AMH e morfologia

## Assessment of the relationship of basal serum anti-mullerian hormone levels with oocyte quality and pregnancy outcomes in patients undergoing ICSI

**Table III.** Distribution of the oocyte characteristics between the two groups

	AMH		p-value
	<1.90 ng/ml (n= 12) n(%)	≥1.90 ng/ml (n= 32) n(%)	
Oocytes collected	43	298	
Mature oocytes	34 (79.0)	244 (81.8)	0.65
Normal oocytes	4 (11.8)	50 (20.5)	0.22
Abnormalities	30 (88.2)	194 (79.5)	
Intense PVD	8 (26.7)	38 (19.6)	0.37
SER	1 (3.3)	1 (0.5)	0.25
IC	7 (23.3)	25 (12.9)	0.12
GPVS	6 (20.0)	13 (6.7)	0.01
PPB	4 (13.3)	27 (13.9)	0.93
Thick zoster	12 (40.0)	94 (48.5)	0.38
Central granulation	11 (36.7)	63 (32.5)	0.65
Small PV	0	5 (2.6)	1.00
Vacuolization	0	2 (1)	1.00
Double Polarity	0	1 (0.5)	1.00

Chi-square test

PVD: Perivitelline debris

IC: Inclusion particle

PV: Small perivitelline space

GPVS: Wide perivitelline space

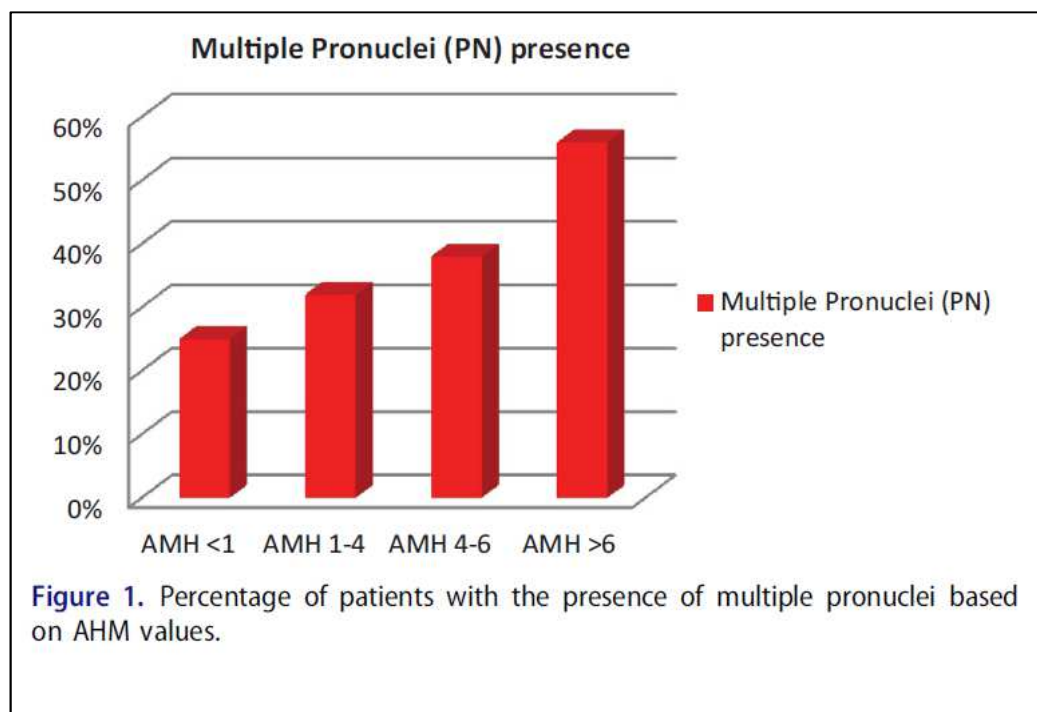
SER: SER appearance in the cytoplasm

PPB: Fragmented polar body

Except for the wide perivitelline space abnormality, oocyte morphology was not different between the groups with high or low AMH levels

AMH is not a valuable tool to evaluate oocyte quality, the development of high-quality embryos, or pregnancy conception

## The impact of anti-Müllerian hormone (AMH) on multiple pronuclei (PN) presence and oocyte maturity in ICSI treatments



AMH significantly correlates with the presence of multiple pronuclei in the zygote

The number of zygotes with the presence of pronuclei increased when AMH levels were higher

AMH levels could be used as a predictive marker

## Anti-Müllerian hormone levels to predict oocyte maturity and embryo quality during controlled ovarian hyperstimulation

TABLE III.—Correlations between serum and follicular fluid AMH concentration and AFC and COH outcomes.

	Basal AMH		AMH-GNRH		AMH-HCG		AMH FF	
	r Pearson	P	r Pearson	P	r Pearson	P	r Pearson	P
AFC	0.505	<0.00001	0.498	<0.001	0.493	<0.001	0.162	ns
No. of follicles >11 mm on hCG day	0.511	<0.00001	0.455	0.002	0.52	<0.001	0.110	ns
Total gonadotrophin dose used	-0.404	0.024	-0.368	0.042	-0.676	<0.001	0.077	ns
E2 on hCG day	0.104	ns	0.138	ns	0.161	ns	-0.288	ns
No. of oocytes retrieved	0.406	0.008	0.349	0.023	0.314	ns	0.157	ns
N° of MII oocytes	0.57	<0.00001	0.421	0.006	0.287	ns	0.263	ns
Fertilization rate	-0.083	ns	-0.182	ns	0.013	ns	-0.180	ns
TQE*	0.264	ns	0.212	ns	0.334	0.04	-0.07	ns

Basal AMH: basal measurement on initial follicular phase; AMH-GNRH: levels on mid-follicular phase the day of GnRH-antagonist introduction; AMH-HCG: levels the day of hCG administration; TQE: Top Quality Embryos; AFC: antral follicle count; E2: estradiol; MII oocytes: oocytes metaphase II.

Although the present study adds valuable new data on the predictive capacity of AMH in IVF/ICSI cycles, randomized controlled trials are needed to confirm these findings

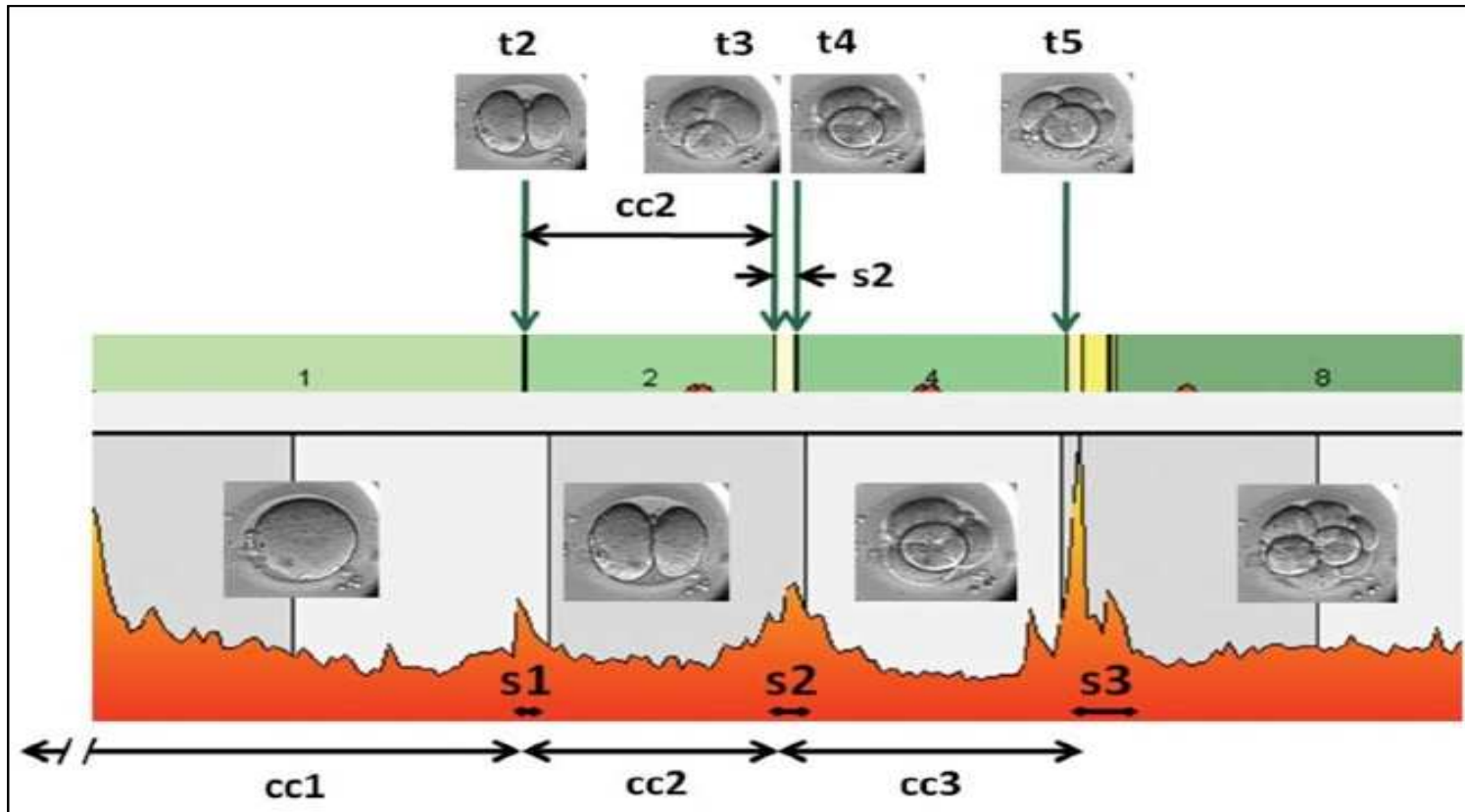
## *Studio morfocinetico dell'embrione*

---



Unisce l'analisi morfologica allo studio della cinetica dello sviluppo embrionario mediante un sistema di videocamere all'interno degli incubatori

# Studio morfocinetico dell'embrione



cc2  
tempo di divisione da 2 a 3  
cellule ( $\leq 11.9$  h)

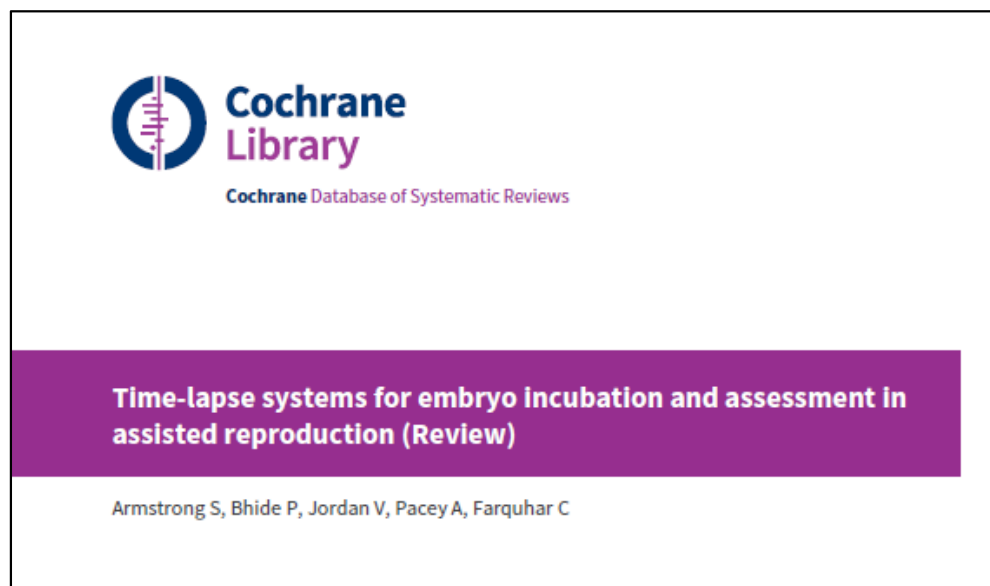
s2  
tempo di divisione da 3 a 4  
cellule ( $< 0.76$  h)

t5  
tempo di divisione a 5 cellule  
(48.8-56.6 h)

Moovie

## *Studio morfocinetico dell'embrione*

---



*There is insufficient evidence of differences in live birth, miscarriage, stillbirth or clinical pregnancy to choose between TLS, with or without embryo selection software, and conventional incubation. The studies were at high risk of bias for randomisation and allocation concealment, the result should be interpreted with extreme caution*

---

AMH e morfocinetica

## Anti-Mullerian hormone (AMH) and embryo quality assessed by time-lapse imaging (TLI): a cross-sectional observational study

**Table 2** Baseline and outcome variables in KID score categories

No.		KID 5	KID 4	KID 3	KID 2	KID 1	<i>p</i>
1	Serum AMH (pmol/l)	16.36	15.05	15.38	16.77	12.76	0.135
2	Age (years)	35.07	35.16	37.31	36.14	36.81	0.049*
3	Body mass index	24.73	24.66	25.72	23.91	23.34	0.411
4	Current smokers (as a % of smokers)	31.8%	40.9%	4.5%	4.5%	18.2%	0.660
5	Method of insemination: IVF/ICSI(%)	20.3/79.7	38.4/61.6	15.5/84.6	39.3/60.7	36.5/63.5	0.033*
6	Pregnancy rate (positive serum beta HCG, IU/L)(%)	37	15.1	0	21.7	11.5	<0.001*

No significant association between serum AMH and embryo quality assessed by time-lapse imaging

# Serum Anti-Mullerian hormone and embryo morphokinetics detecting by time-lapse imaging: A comparison between the polycystic ovarian syndrome and tubal factor infertility

**Table II.** Spearman's rank correlation analysis between AMH and number of oocytes, and embryos in addition to embryos' kinetics in two groups

Variables	AMH			
	PCOS group (n= 289)		Tubal factor group (n= 258)	
	rs	p-values	rs	p-values
Age (yr)	-0.69	0.000*	-0.49	0.000*
Oocytes retrieved	0.45	0.001*	0.40	0.003*
Mature MII oocytes	0.42	0.002*	0.35	0.011*
Number of embryos	0.40	0.004*	0.25	0.040*
Kinetic marker(hours post ICSI), tPNf	0.06	0.278	-0.07	0.234
t2	0.02	0.622	0.02	0.723
t3	0.04	0.485	0.10	0.098
t4	0.01	0.745	0.68	0.279
t5	-0.13	0.025*	0.02	0.872
t6	-0.08	0.143	0.09	0.144
t7	-0.05	0.375	0.05	0.392
t8	-0.13	0.024*	-0.03	0.623
cc2	0.02	0.696	0.10	0.108
cc3	-0.14	0.013*	-0.10	0.098
s1	-0.03	0.511	0.07	0.241
s2	-0.02	0.626	-0.09	0.147
s3	0.00	0.879	-0.06	0.284

\* p<0.05.

AMH= Antimullerian hormone

ICSI: Intracytoplasmic sperm injection

t3= Time to 3 cells

t6= Time to 6 cells

cc2= Duration of the second cell cycle (t3-t2)

s1, s2 and s3= Complete first, second and third synchronous divisions: s1: (t2-tPNf), s2 (t4-t3), and s3 (t8-t5)

PCOS= Poly cystic ovarian syndrome

tPNf= Time to pronuclear fading

t4= Time to 4 cells

t7= Time to 7 cells

rs= Correlation coefficient

t2= Time to 2 cells

t5= Time to 5 cells

t8= Time to 8 cells

cc3= Duration of the third cell cycle (t5-t3)

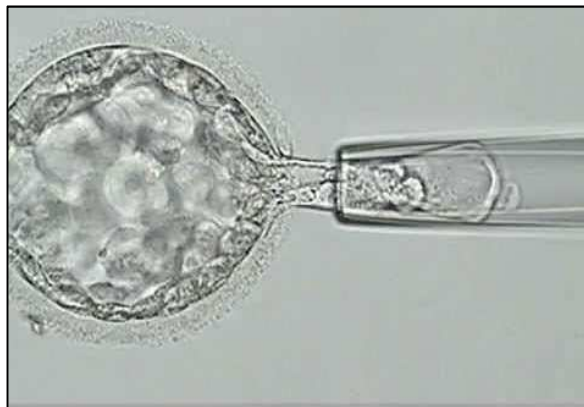
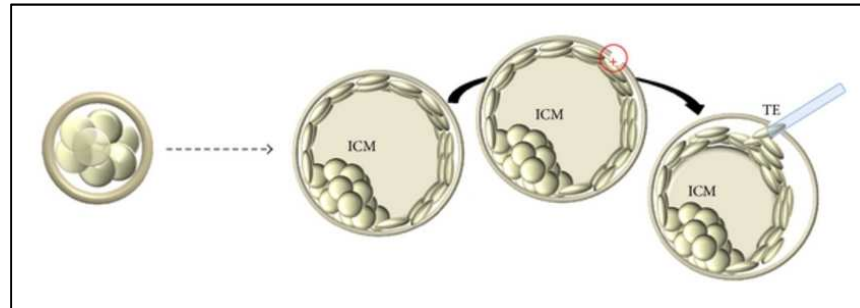
AMH was negatively correlated with t5, t8, and cc3 among PCOS women

AMH had no correlation with embryo kinetics in infertile women with TF infertility

# *Studio genetico dell'embrione*

Analisi di una biopsia dell'embrione per valutarne lo stato di euploidia

## *Pre-Implantation Genetic Test (PGT)*



## *Studio genetico dell'embrione*

---

In base alle mutazioni che studia, la PGT è classificata in:

- ✓ PGT-M (ricerca delle mutazioni monogeniche)
- ✓ PGT-SR (ricerca dei riarrangiamenti strutturali)
- ✓ PGT-A (ricerca delle aneuploidie)

La PGT:

- ✓ Non aumenta i tassi di gravidanza
- ✓ Riduce gli aborti spontanei
- ✓ Riduce il *Time-To-Pregnancy*
- ✓ Riduce il rischio di trasmissione di malattie genetiche

---

AMH ed euploidia

# Significant correlation between anti-müllerian hormone and embryo euploidy in a subpopulation of infertile patients

**Table 3 – Regression coefficients for the binomial regression of the proportion of euploid embryos with AMH as covariate, overall and by age group, controlling for age, AFC, BMI and parity.**

Model/subset	Increase in odds of euploid embryos <sup>a</sup>	P-value
Total	1.08 (1.01–1.15)	0.02
≤36 years	1.09 (1.01–1.17)	0.02
37–40 years	1.15 (0.94–1.40)	NS
≥41 years	0.82 (0.33–1.89)	NS

<sup>a</sup> Per 10 pmol/l increase in AMH.  
AMH = anti-Müllerian hormone; AFC = antral follicle count; BMI = body mass index; NS = not statistically significant.

Using multivariate regression controlling for age, AFC, BMI and parity, there was a statistical association between serum AMH and proportion of euploid embryos

Herein we demonstrate a positive correlation between serum AMH and euploidy rate among blastocysts of infertile patients younger than 37 years of age

## Anti-Müllerian hormone in association with euploid embryo transfer outcomes

**Table 3. Euploid transfer outcomes in relation to AMH**

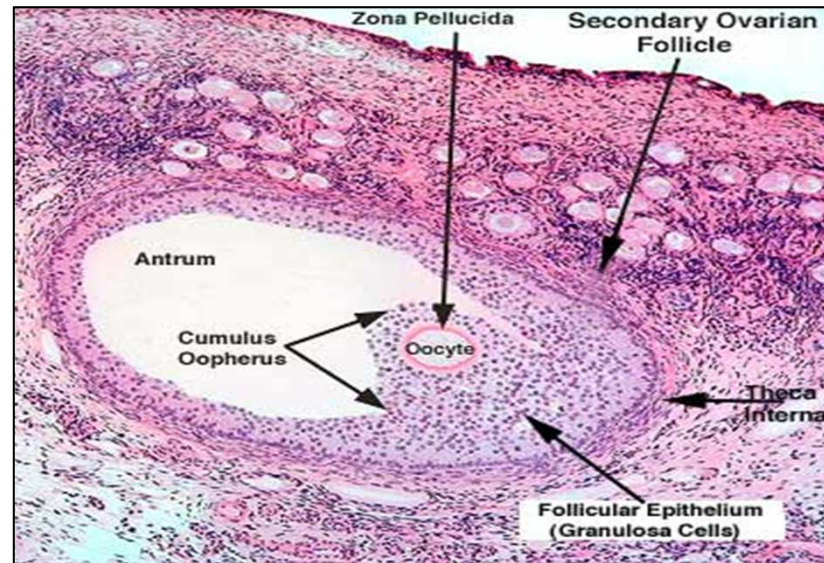
AMH group (ng/mL)	Number of ongoing pregnancies	Unadjusted implantation rate (IR)	Adjusted odds ratio IR, OR (95% CI)	p-value	Unadjusted ongoing pregnancy (OP) rate	Adjusted odds ratio OP, OR (95% CI)	p-value
1 to <5	123	69.4%	Reference		52.3%	Reference	
<1 (low)	37	69.10%	0.65 (0.30-1.44)	0.29	54.40%	0.80 (0.43-1.50)	0.49
5+ (high)	45	68.6%	1.27 (0.61-2.65)	0.53	52.3%	1.41 (0.68-2.90)	0.36

L'impianto degli embrioni euploidi non dipende dai valori di AMH

AMH concentration was not associated with positive bHCG or ongoing pregnancy for euploid embryo transfers after adjustment for potential confounders

## *Studio biochimico del fluido follicolare*

Ricerca di indicatori della competenza ovocitaria/embrionaria nel fluido follicolare



Non esiste un singolo marker

I dati fino ad oggi ottenuti devono essere validati

---

AMH follicolare e sviluppo embrionale

## Anti-Müllerian hormone levels to predict oocyte maturity and embryo quality during controlled ovarian hyperstimulation

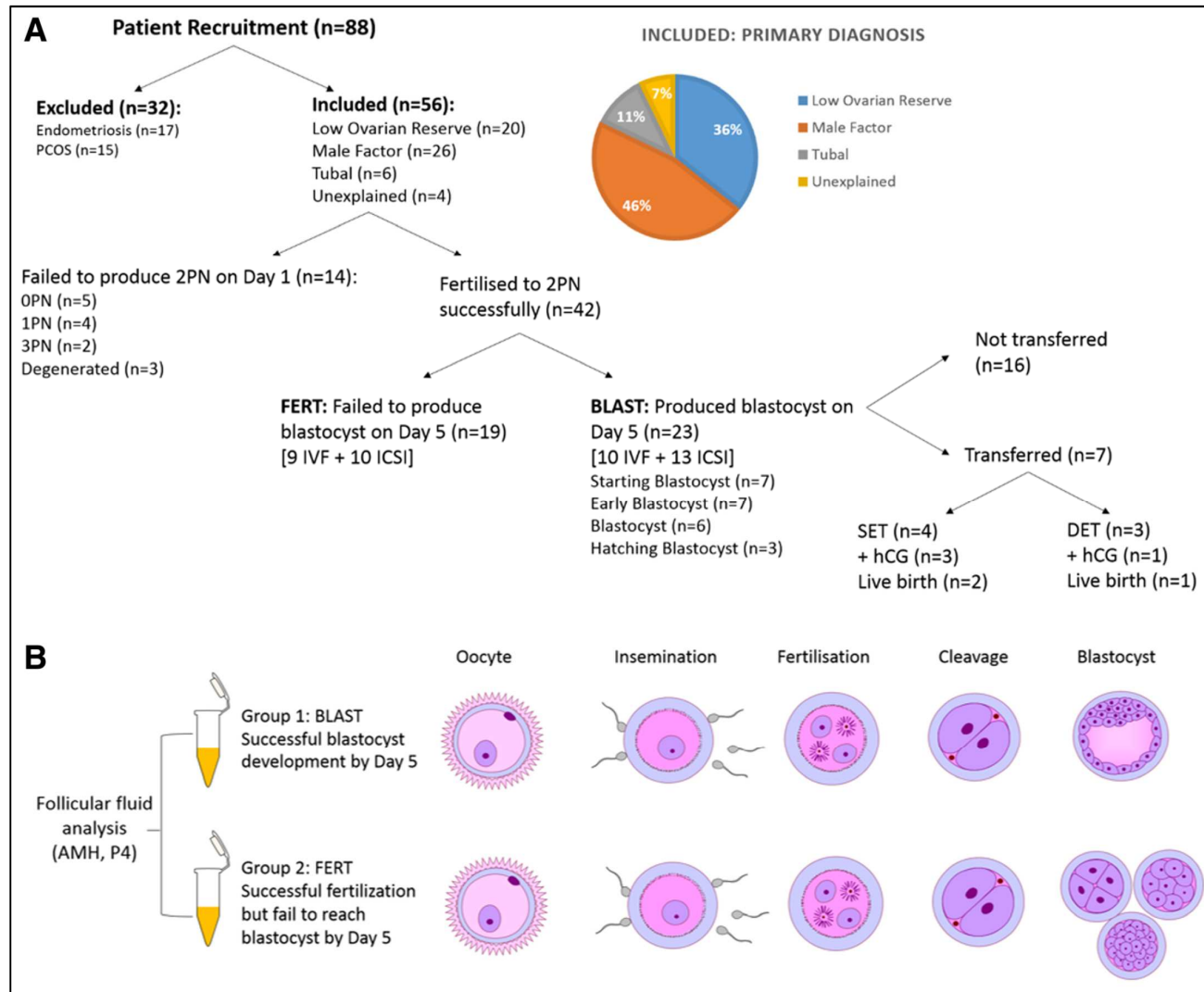
TABLE III.—Correlations between serum and follicular fluid AMH concentration and AFC and COH outcomes.

	Basal AMH		AMH-GNRH		AMH-HCG		AMH-FF	
	r Pearson	P	r Pearson	P	r Pearson	P	r Pearson	P
AFC	0.505	<0.00001	0.498	<0.001	0.493	<0.001	0.162	ns
No. of follicles >11 mm on hCG day	0.511	<0.00001	0.455	0.002	0.52	<0.001	0.110	ns
Total gonadotrophin dose used	-0.404	0.024	-0.368	0.042	-0.676	<0.001	0.077	ns
E2 on hCG day	0.104	ns	0.138	ns	0.161	ns	-0.288	ns
No. of oocytes retrieved	0.406	0.008	0.349	0.023	0.314	ns	0.157	ns
N° of MII oocytes	0.57	<0.00001	0.421	0.006	0.287	ns	0.263	ns
Fertilization rate	-0.083	ns	-0.182	ns	0.013	ns	-0.180	ns
TQE*	0.264	ns	0.212	ns	0.334	0.04	-0.07	ns

Basal AMH: basal measurement on initial follicular phase; AMH-GNRH: levels on mid-follicular phase the day of GnRH-antagonist introduction; AMH-HCG: levels the day of hCG administration; TQE: Top Quality Embryos; AFC: antral follicle count; E2: estradiol; MII oocytes: oocytes metaphase II.

No correlations were found between COH outcome parameters and AMH-FF

# Anti-Müllerian hormone and progesterone levels in human follicular fluid are predictors of embryonic development



**Table 2** Follicular fluid levels of anti-Mullerian hormone and progesterone

	Group 1: BLAST (n = 23)	Group 2: FERT (n = 19)	P-value
Follicular Fluid AMH (pmol/L)	33.07 ± 29.20	13.6 ± 12.3	0.007

Values are given as mean ± standard deviations. Statistically significant,  $P < 0.05$

**Table 3** Correlation between follicular fluid hormone concentration and embryonic development

Classification	BLAST (n)	FERT (n)	Positive Prediction Value	Negative Prediction Value
Anti-Mullerian hormone level > 15 pmol/L Sensitivity: 43%; Specificity: 95%	17	4	76.96%	70.80%
Progesterone level > 60 mg/ml Sensitivity: 74%; Specificity: 74%	10	1	90.99%	58.67%
AMH level > 15 pmol/L + P4 level > 60 mg/ml Sensitivity: 26%; Specificity: 99.9%	6	0	96.83%	53.26%

AMH anti-Mullerian hormone, P4 progesterone

FF AMH levels were significantly increased ( $P = 0.007$ ) in the 'BLAST' group ( $33.13 \pm 28.83$  pmol/L) compared to the 'FERT' group ( $13.6 \pm 12.3$  pmol/L)

Combining follicular fluid analysis with routine morphological assessment, could allow for a more accurate and sensitive method of determining embryonic developmental competence

# Oocyte matched follicular fluid anti-Mullerian hormone is an excellent predictor of live birth after fresh single embryo transfer

**Table II** AMH, gonadotropin and androgen levels in FF, in relation to the laboratory outcomes of the corresponding oocytes: fertilisation and subsequent embryo development.

	No fertilisation after ICSI	Fertilisation after ICSI	TQ embryo on the 3rd day	TQ blastocyst on the 5th day
<b>Number of FF samples</b>	n=70	n=252	n=87	n=34
AMH in FF [ng/ml], mean (SD)	3.34 (2.21)	4.23 (4.19)	4.29 (4.44)	6.33 (5.52) <sup>‡</sup>
FSH in FF [mIU/ml], mean (SD)	9.06 (3.36)	7.48 (3.75)*	6.73 (3.01) <sup>#</sup>	5.36 (2.20) <sup>‡</sup>
LH in FF [mIU/ml], mean (SD)	0.80 (0.86)	0.99 (1.30)	1.21 (1.91)	1.57 (2.86)
A2 in FF [ng/ml], mean (SD)	30.58 (59.54)	15.13 (4.29)*	13.07 (21.31) <sup>#</sup>	11.53 (9.67) <sup>‡</sup>
T in FF [ng/ml], mean (SD)	7.71 (5.09)	9.13 (6.07)	8.81 (6.05)	10.08 (6.37)

AMH—anti-Müllerian hormone; FF—follicular fluid; ICSI—intracytoplasmic sperm injection; TQ—top quality; mean (SD)—mean values ± standard deviation; FSH—follicle stimulating hormone; LH—luteinising hormone; A2—androstenedione; T—testosterone.

\*Student t-test p < 0.05 for no fertilisation vs. fertilisation;

<sup>#</sup>Student t-test p < 0.01 for no fertilisation vs. TQ embryo on the 3rd day;

<sup>‡</sup>Student t-test p < 0.01 for no fertilisation vs. TQ embryo on the 5th day.

**Table III** AMH, gonadotropin and androgen levels in FF, in relation to the clinical outcomes of the corresponding oocytes: live births.

	No pregnancy	Live birth	p*
<b>Number of single embryo transfers<sup>‡</sup></b>	n=70	n=34	
AMH in FF [ng/ml], mean (SD)	2.45 (2.31)	7.49 (5.03)	<0.001
FSH in FF [mIU/ml], mean (SD)	8.91 (4.93)	5.60 (1.41)	<0.001
LH in FF [mIU/ml], mean (SD)	0.92 (0.81)	0.88 (0.86)	0.839
A2 in FF [ng/ml], mean (SD)	13.59 (38.68)	21.93 (32.81)	0.116
T in FF [ng/ml], mean (SD)	9.93 (6.77)	11.64 (7.48)	0.274

AMH—anti-Müllerian hormone; FF—follicular fluid; mean (SD)—mean values ± standard deviation; FSH—follicle stimulating hormone; LH—luteinising hormone; A2—androstenedione; T—testosterone.

\*Student t-test.

<sup>‡</sup>The sum is 104 because two miscarriages were not taken into consideration.

AMH concentration in FF on the day of oocyte retrieval is closely related to the oocyte's quality  
 It predict TQ embryo development with high implantation potential and thus predict a high probability  
 of live birth

## AMH as the primary marker for fertility

**Table 1** AMH as the primary marker for fertility.

### Cons

AMH correctly predicts the number of follicles or oocytes after whatever treatment is initiated but it cannot predict the amount of genetic damage that eventually determines embryo quality and subsequent pregnancy.

In normal populations, women with a low serum AMH level achieve similar pregnancy rates compared to those with normal or high AMH levels.

There is no direct evidence demonstrating that a lower AMH is predictive of reduced chance to conceive naturally after cancer treatment.

### Pros

The AMH assay now competes with antral follicle count since its level is strongly correlated with this parameter and from a theoretical point of view, reflects follicular growth over a wider range.

Some studies found a negative association between the serum AMH level and time to pregnancy in fertile women but large variation in fecundity within similar AMH concentrations precluded any establishment of cut-offs.

The AMH assay can be considered as the primary marker for fertility when primordial follicles and/or growing follicle pool(s) are altered, either in excess as in the polycystic ovary syndrome (PCOS), or by default, secondary to early follicular depletion, whether primitive or secondary, in premature ovarian failure (POF).

L'impiego di AMH in Medicina della Riproduzione si presta ad ulteriori studi

Oggi ci ripromettiamo un “dialogo continuo dalla diagnosi alla terapia”

Per cui come Centro di Fisiopatologia della Riproduzione Umana ci proponiamo come partner per  
eventuali collaborazioni di ricerca sull'AMH

Grazie per l'attenzione