



Medicina Personalizada em Reprodução Assistida:  
Avaliação Embrionária Através de  
Time Lapse e a Inteligência Artificial

# Resultados recentes no uso do Time Lapse como avaliação embrionária

**Edson Borges Jr.**



**Declaro:**

**Ausência de Conflito de Interesse**

**Resolução do Conselho Federal de Medicina  
nº 1.595/2.000**



## ESHRE 2019 – Time Lapse



FERTILITY

## O-116 Non-invasive embryo selection: Live birth can be predicted by means of the kinetic analysis of female and male pronuclei formations

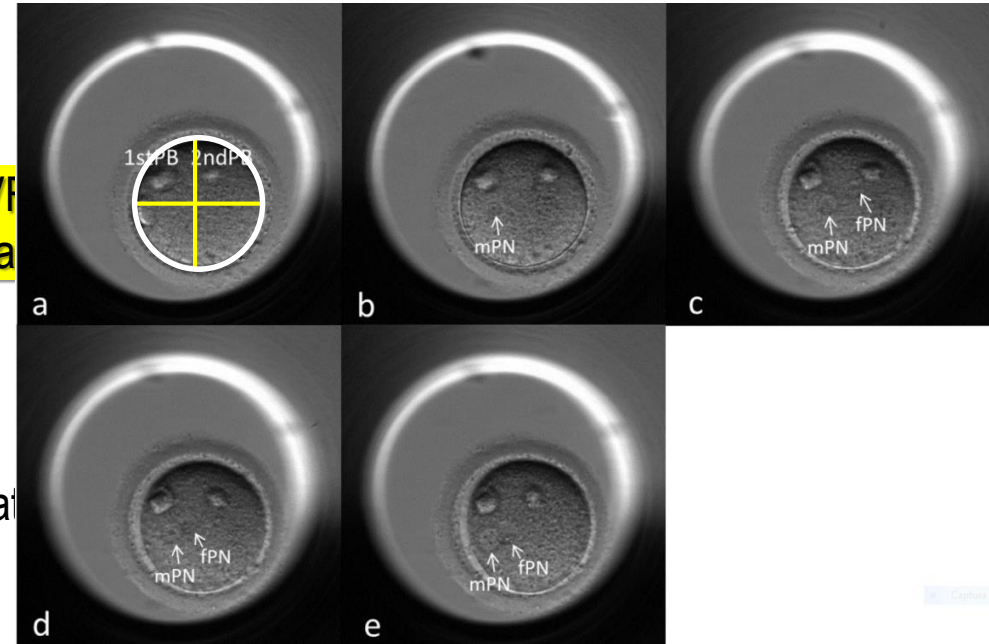
J. Otsuki<sup>1,2</sup>, T. Iwasaki<sup>2</sup>, N. Enatsu<sup>2</sup>, Y. Katada<sup>2</sup>, K. Furuhashi<sup>2</sup>, M. Shiotani<sup>2</sup>

<sup>1</sup>Okayama University, ART Center, Okayama, Japan, <sup>2</sup>Hanabusa Women's Clinic, Reproductive Medicine, Kobe-Hyogo, Japan

- ✓ Time-lapse recordings were performed and the areas of male and female pronuclei were retrospectively analyzed by measuring their vertical and horizontal diameters. These measurements were taken 4 and 8 hours before the pronuclear membrane breakdown (PNMBD), and immediately before the PNMBD.

- ✓ When normal embryos were defined as  $AUC \cap B$ , the birth rates for IVF respectively. For the remaining embryos, defined as abnormal, birth ra

- ✓ **Wider implications of the findings:**  
In this study, we established a method of non-invasive embryo evaluation of trophoblast cells.



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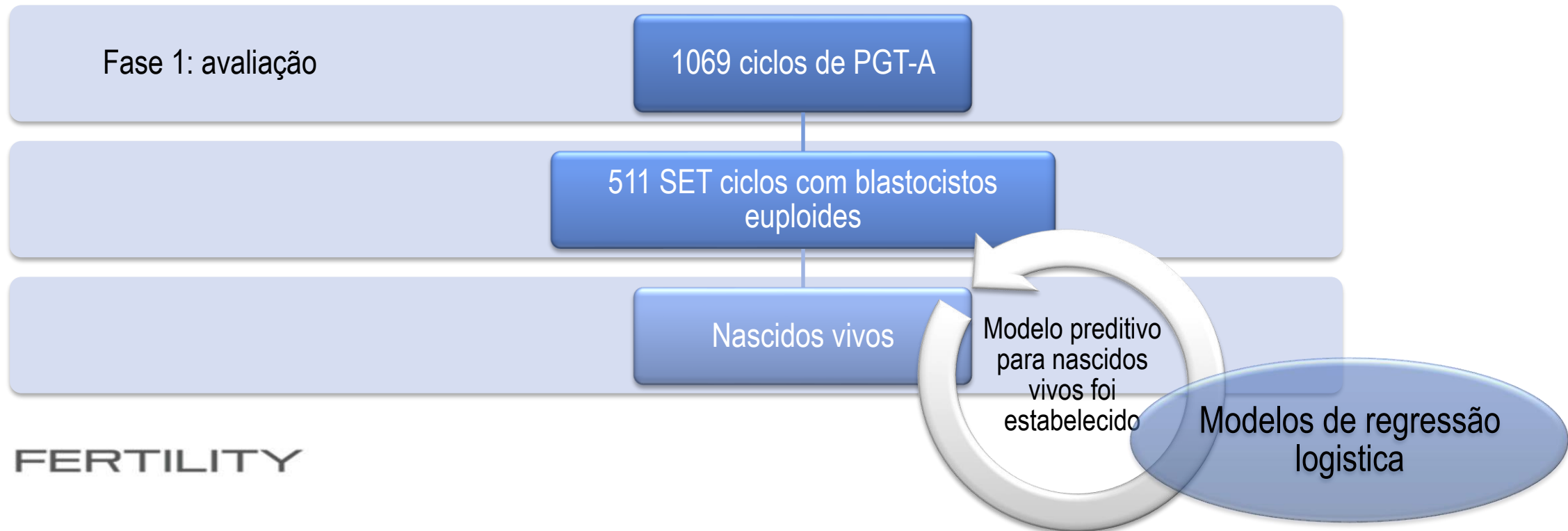
© 2015

## O-006 Time of morulation and trophectoderm quality are associated with live birth after euploid blastocyst transfer: a multicenter study

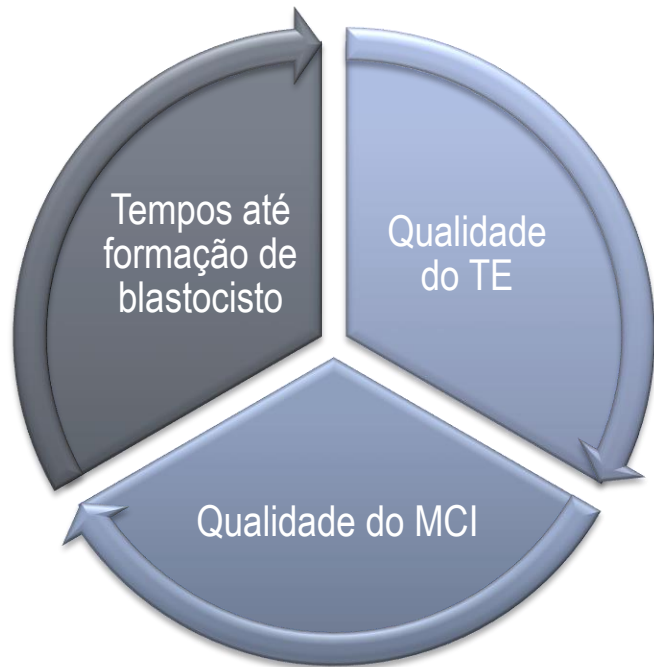
L.F. Rienzi<sup>1</sup>, D. Cimadomo<sup>1</sup>, A. Delgado<sup>2</sup>, M.G. Minasi<sup>3</sup>, G. Fabozzi<sup>1</sup>, R. Del Gallego<sup>2</sup>, M. Stoppa<sup>1</sup>, J. Bellver<sup>2</sup>, A. Giancani<sup>1</sup>, M. Esbert<sup>4</sup>, A. Capalbo<sup>5</sup>, J. Remohí<sup>2</sup>, E. Greco<sup>3</sup>, F.M. Ubaldi<sup>1</sup>, M. Meseguer<sup>2</sup>

1. Clinica Valle Giulia, G.EN.E.R.A. Center for Reproductive Medicine, Roma, Italy, 2. IVI-RMA, IVI-Valencia, Valencia, Spain, 3. European Hospital, Center for reproductive medicine, Rome, Italy, 4. IVI-RMA, IVI-Barcelona, Barcelona, Spain, 5. Igenomix, Igenomix Italia, Marostica, Italy

- **Objetivo:** Avaliar se a caracterização morfodinâmica de blastocistos euploides tem valor prognóstico para o resultado de gestação.



- Métodos



Fase 2: Validação

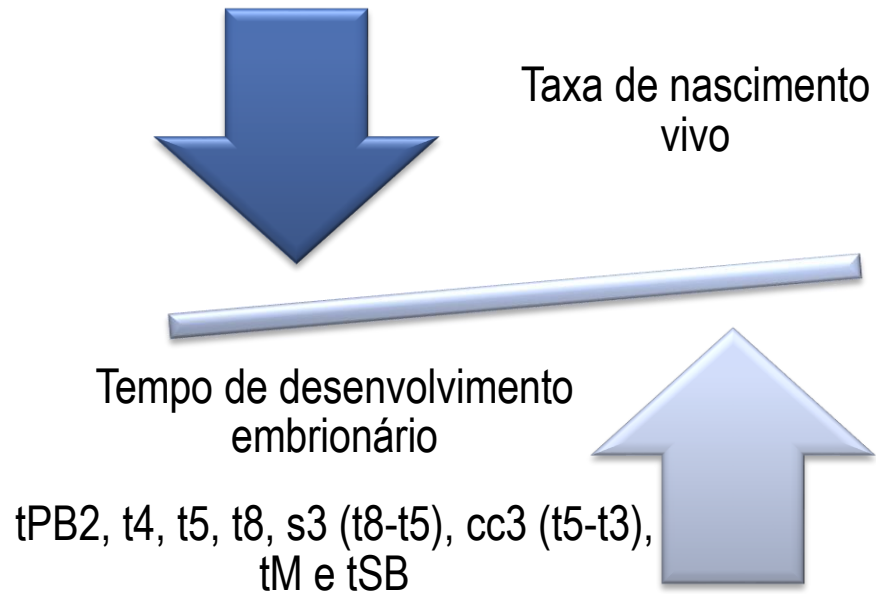
546 ciclos de PGT-A

319 SET ciclos com blastocistos euploides

Gestação continuada

- **Resultados**

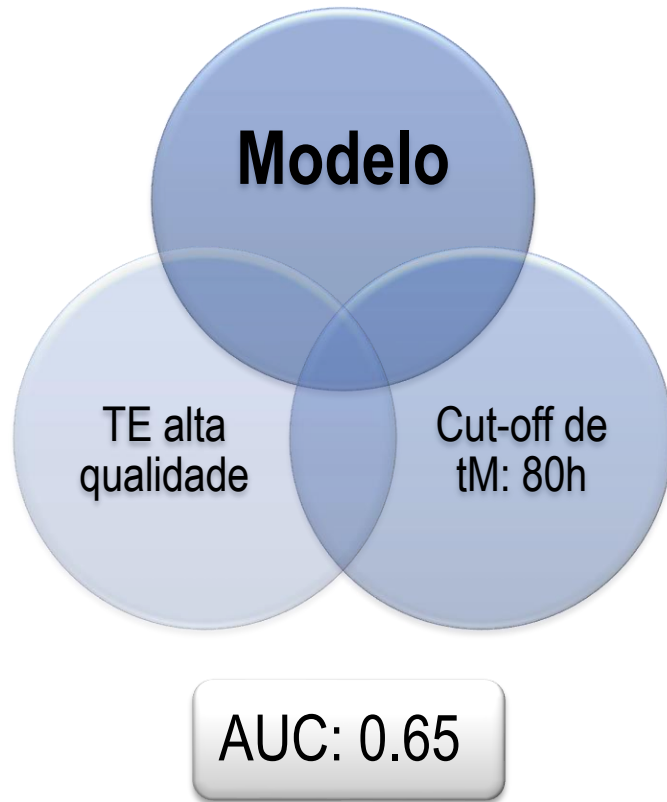
- Taxa de nascidos vivos nos três centros com SET de blastocistos euploides: 40%



Qualidade do MCI e TE correlacionaram-se positivamente com chance de nascidos vivos

Apenas tM e qualidade de TE foram variáveis independentes correlacionadas com taxa de nascidos vivos (análise multivariada)

- **Resultados**



O modelo validado em 319 embriões transferidos (em SET) em 3 centros diferentes

| <b>Modelo (n=117)</b>         | <b>Gestação continuada</b> |
|-------------------------------|----------------------------|
| TE alta qualidade e tM < 80h  | 61,2% (41/67)              |
| TE baixa qualidade e tM > 80h | 30,0% (15/50)              |
| p                             | >0,001                     |

- **Conclusão:** O tempo de morulação e a qualidade do trofocitoderma são fatores preditivos para nascimento vivo.



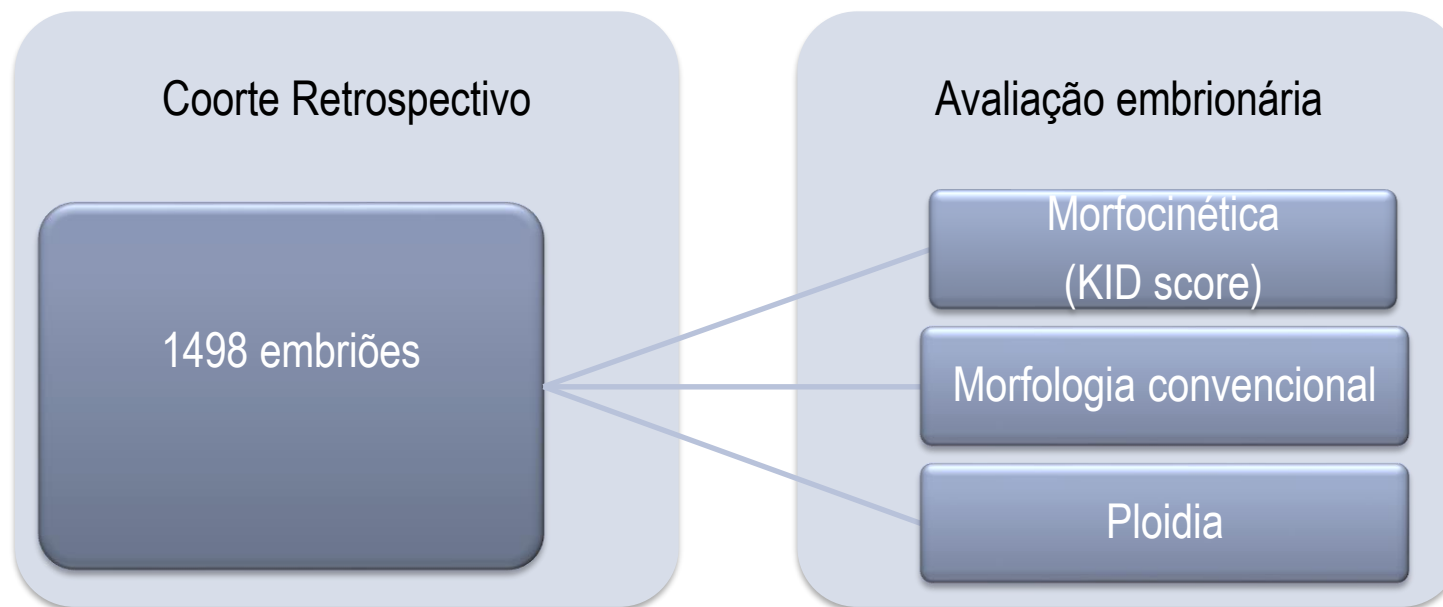
## O-199 Morphokinetics may provide a useful adjunct for selecting Euploid embryos with a high chance of implantation

Y.Y. Lim<sub>1</sub>, M.S.R. Lim<sub>1</sub>, J.J. Chen<sub>1</sub>, P.S.Wong<sub>2</sub>

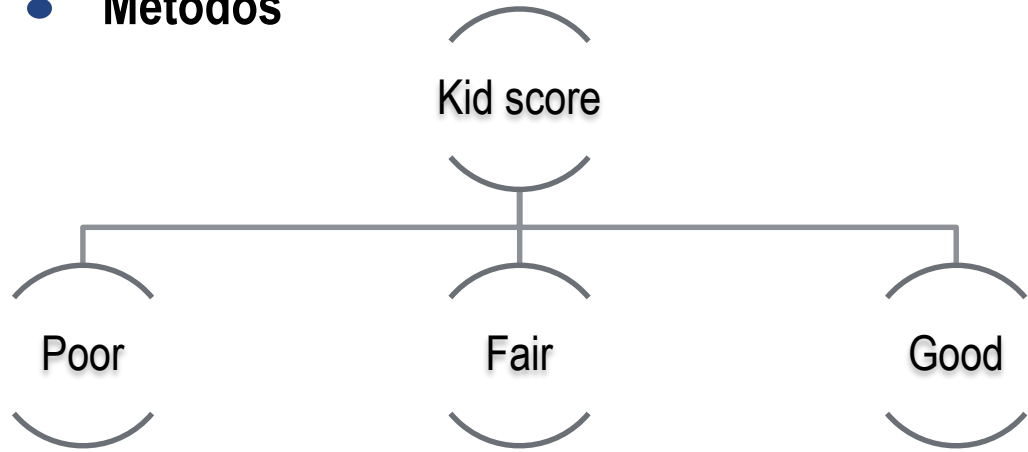
<sub>1</sub>Sunfert International Fertility Centre - Bangsar South, PGT Department, Bangsar South- Kuala Lumpur, Malaysia, <sub>2</sub>Sunfert International Fertility Centre - Bangsar South, Clinical, Bangsar South- Kuala Lumpur, Malaysia

- **Objetivo:** Avaliar se o modelo morfocinético universal baseado em dados conhecidos de implantação (KID) aumentam a chance de selecionar embriões euplóides com maior potencial de implantação

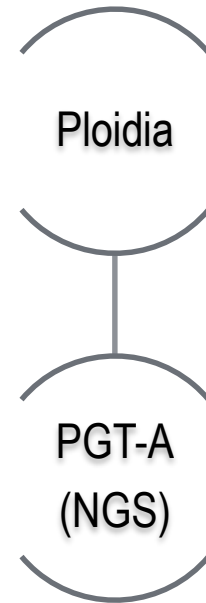
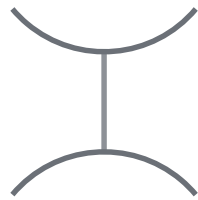
- **Métodos**



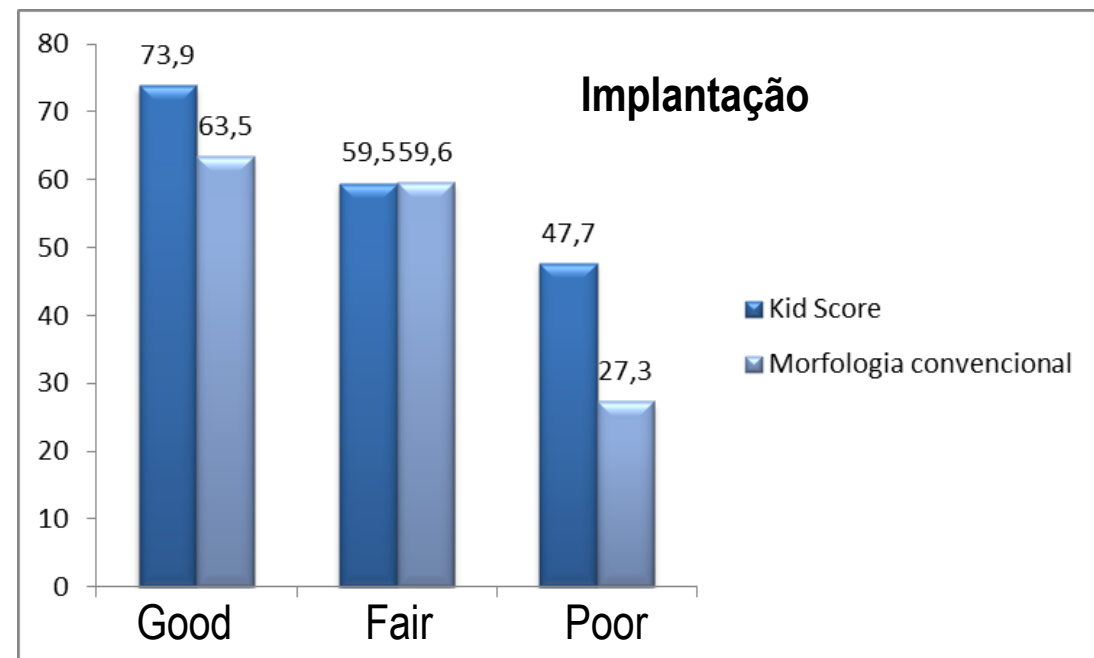
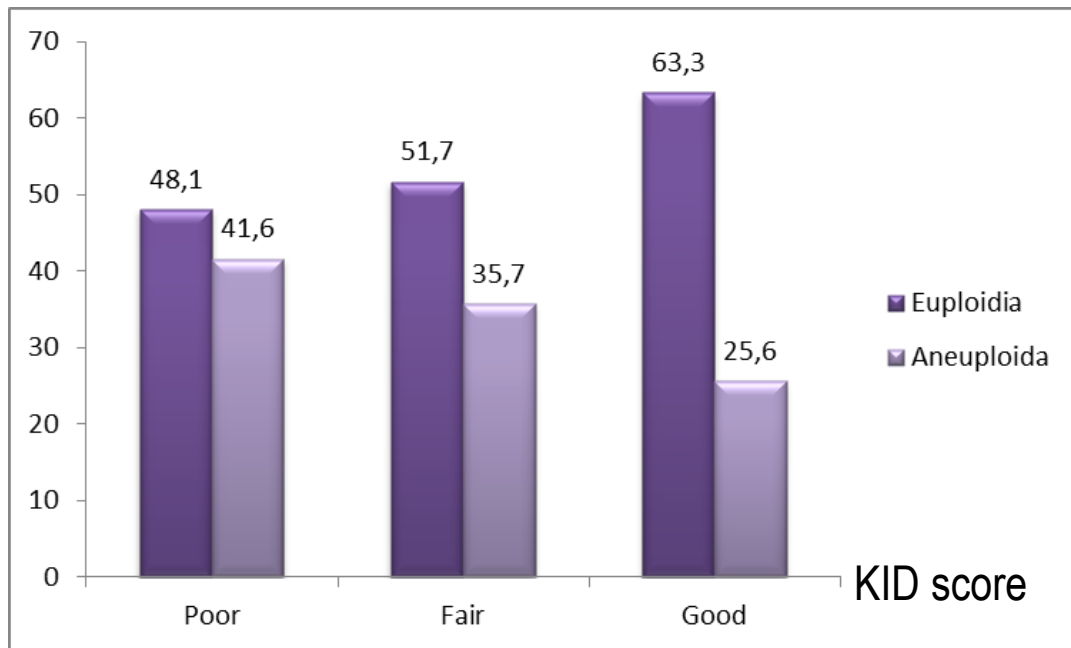
- Métodos



Morfologia convencional



## ● Resultados

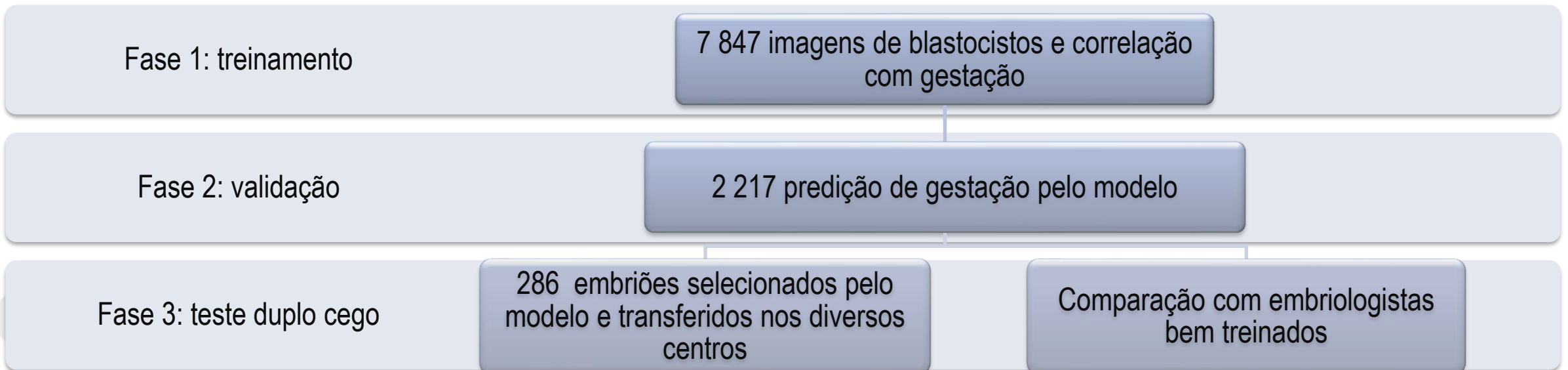


## O-004 Artificial intelligence (AI) technology can predict human embryo viability across multiple laboratories with varying demographics with high accuracy and reproducibility

M.VerMilyea<sup>1,2</sup>, A.Miller<sup>1</sup>, A.Picou<sup>1</sup>, M.Lane<sup>3,4</sup>, G.Adaniya<sup>5</sup>, B.Bopp<sup>6</sup>, D. Morbeck<sup>7</sup>, E. Behnke<sup>8</sup>, L. Click<sup>8</sup>, R. Matthews<sup>9</sup>, A. Lim<sup>10</sup>, J. Hall<sup>11</sup>, A. Murphy<sup>11</sup>, D. Perugini<sup>11</sup>, M. Perugini<sup>11</sup>

1. Ovation Fertility, Laboratory, Austin, U.S.A.; 2. Texas Fertility Center, Clinic, Austin, U.S.A. ; 3. Monash IVF Group, Laboratory, Richmond, Australia ; 4. Repromed, Laboratory, Adelaide, Australia ; 5. Ovation Fertility, Laboratory, Indianapolis, U.S.A.; 6. Midwest Fertility Specialists, Clinic, Carmel, U.S.A. ; 7. Fertility Associates, Laboratory, Auckland, New Zealand ; 8. Ovation Fertility, Laboratory, Cincinnati, U.S.A.; 9. Oregon Reproductive Medicine, Laboratory, Portland, U.S.A. ; 10. Alpha Fertility Centre, Laboratory, Petaling Jaya, Malaysia ; 11. Life Whisperer, Company, Adelaide, Australia

- **Objetivo:** Verificar se a avaliação de imagens de embriões por IA podem prever a viabilidade embrionária
- **Métodos**



- **Resultados**

84,6% para identificação de embriões viáveis

57,7% para identificação de embriões não viáveis

**Cross validation: 71,6%.**

**Melhoria de 32% quando comparado aos embriologistas**

- **Implicações:** Os dados aqui apresentados, mostram , pela primeira vez, como um modelo de IA pode ser aplicado em um ambiente misto e multicêntrico (diferentes centros em diferente países), resultando em uma precisão de 70% para a identificação de embriões viáveis e não viáveis.

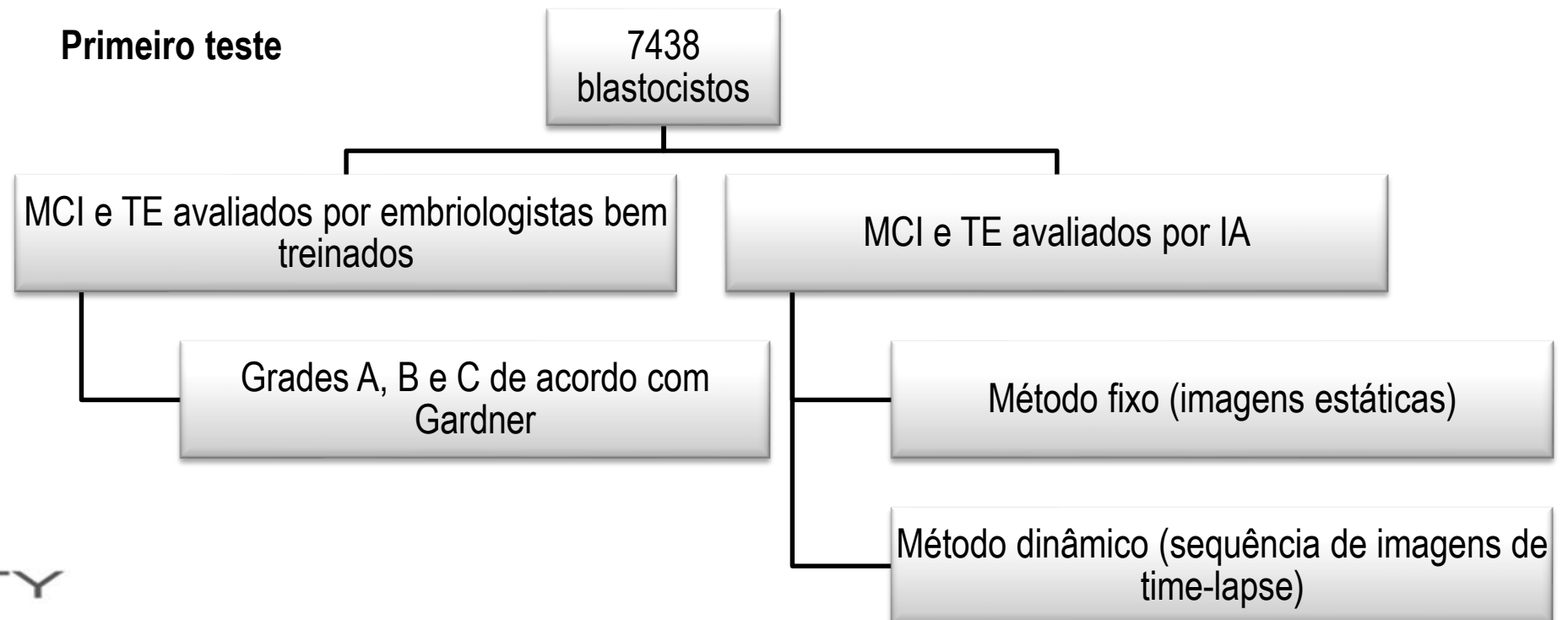
# O-168 Automatic morphological grading of human blastocysts with time-lapse imaging and artificial intelligence

M.F. Kragh<sub>1</sub>, J. Rimestad<sub>2</sub>, J. Berntsen<sub>2</sub>, H. Karstoft<sub>3</sub>

<sub>1</sub> Vitrolife A/S & Aarhus University, Research & development, Aarhus S, Denmark, <sub>2</sub> Vitrolife A/S, Research & development, Aarhus S, Denmark, <sub>3</sub> Aarhus University, Department of Engineering, Aarhus N, Denmark

- **Objetivo:** Verificar se a avaliação de blastocistos humanos pode ser totalmente automatizada com imagens de STL e IA para fornecer informações semelhantes ou superiores aquelas obtidas por embriologistas experientes.

- **Métodos**



- **Métodos**



### **Segundo teste**

55 embriões transferidos foram avaliados por um grupo de embriologistas e maioria dos votos comparado com IA

- **Teste 1**

|                |     | <b>Acurácia</b> |
|----------------|-----|-----------------|
| Embriologistas | MCI | 65,1            |
|                | TE  | 73,8            |
| IA             | MCI | 72,7            |
|                | TE  | 77,6            |

- **Teste 2**

|                |              | <b>Implantação</b> |
|----------------|--------------|--------------------|
| Embriologistas | Top quality  | 44,6               |
|                | Good quality | 30,7               |
| IA             | Top quality  | 46,0               |
|                | Good quality | 34,4               |

- **Conclusão:** A IA teve um desempenho melhor que os embriologistas para avaliação do MCI e TE e a seleção dos embriões por meio da IA levou a melhores taxas de implantação para o grupo de embriões com melhores classificações





# ASRM 2019 – Time Lapse



FERTILITY

## P-109 Odds of euploidy are significantly associated with not only age but blastocyst morphokinetic parameters and ICM/trophectoderm characteristics

Nina Desai, Ph.D., HCLD,<sup>a</sup> Jeffrey M. Goldberg, M.D.,<sup>b</sup> Rebecca Flyckt, MD,<sup>a</sup> Marjan Attaran, M.D.,<sup>a</sup> Julie Tantibhedhyankul, M.D.,<sup>a</sup> Cynthia M. Austin, M.D.<sup>a</sup>

<sup>a</sup>Cleveland Clinic, Beachwood, OH; <sup>b</sup>Cleveland Clinic, Cleveland, OH

- **Objetivo:** Avaliar o valor preditivo de parâmetros morfocinéticos e morfologia do TE e MCI para euploidia

2 493 zigotos cultivados em incubadoras com STL

- t2, t3, t4, t5, t8, tM, tSB, tBL, tEBL, tHB foram anotados
- Presença de dismorfismos anotada
- Grau de maturidade do blastocisto, qualidade de TE e MCI avaliadas
- Atribuído score ao blastocisto de 1 a 6

- **Resultados**

1258 blastocistos biopsiados

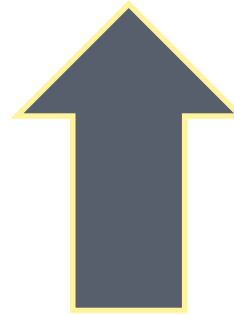


465 (37%) euplóides

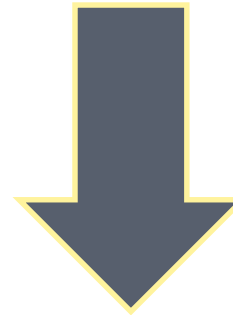
Presença de mais de um dismorfismo durante o estágio de clivagem



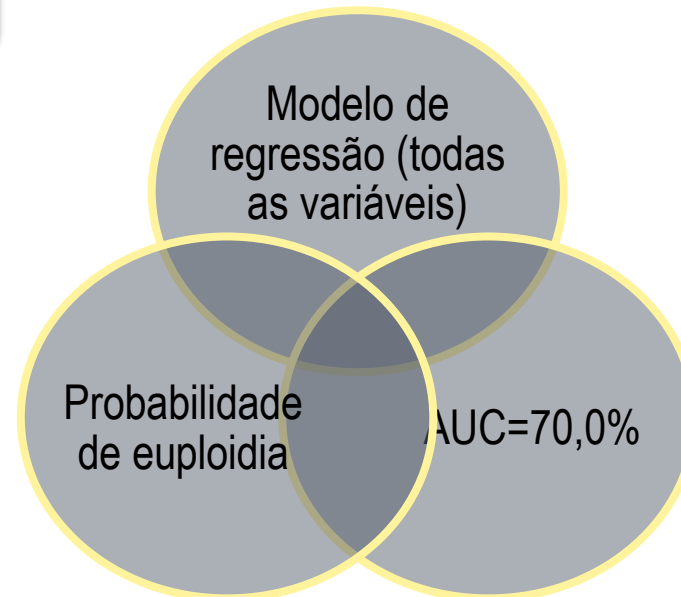
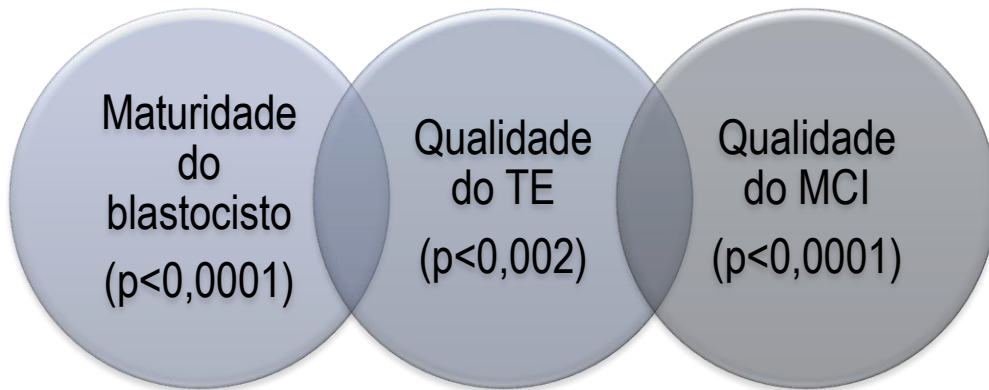
Diminuição de 49% na chance de euploidia



Para cada hora a mais no tempo entre início de blastulação e eclosão



Diminuição na chance de euploida em 4,1%



## P-310 Impact of different degrees of genetic mosaicism in the kinetic profile of the human embryo

Angel M. Bastida, MSc,<sup>a</sup> Carmen Vidal, M.D., Ph.D.,<sup>a</sup> Lorena Rodrigo, PhD,<sup>b</sup> Amparo Mercader, PhD,<sup>a</sup> Carmen Rubio, PhD,<sup>b</sup> Juan Giles, M.D., Ph.D.,<sup>a</sup> Jose Alejandro Remohi, MD, PhD,<sup>c</sup> Ma Jose de los Santos, PhD<sup>a</sup>

<sup>a</sup> IVIRMA Valencia, Valencia, Spain; <sup>b</sup> Igenomix Spain, Paterna (Valencia), Spain; <sup>c</sup> IVIRMA Valencia, Valencia, Spain.

- **Objetivo:** correlacionar os diferentes graus de mosaicismo com o perfil morfocinético de embriões cultivados no STL

688 embriões de 172 pacientes

Parâmetros Morfocinéticos  
tPB2, tPNa, tPNf, t2, t3, t4, t5, t8  
and t9, tSC, tM, tSB, tB, tEB tHB

Conteúdo de células aneuplóides  
por NGS: euplóide (<30%),  
baixo grau de mosaicismo (30-  
50%) e alto grau de mosaicismo  
(50-70%)

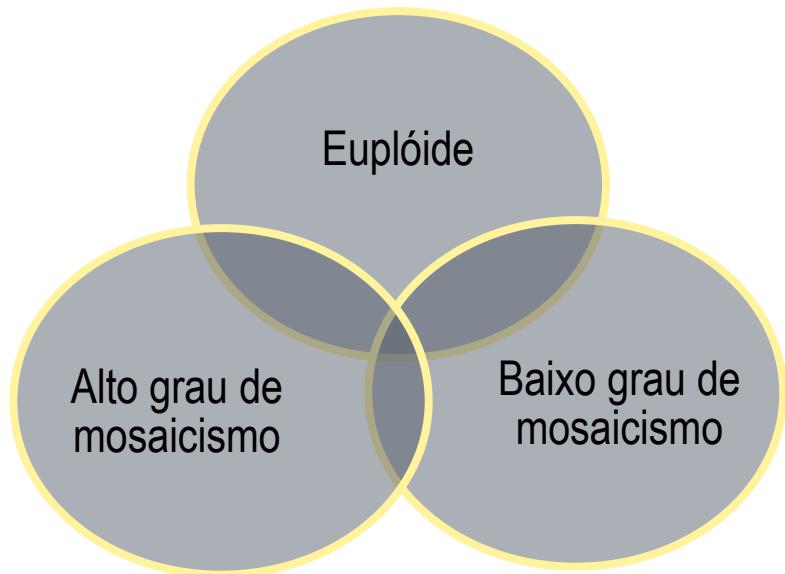
ANOVA e postroc de bonferroni



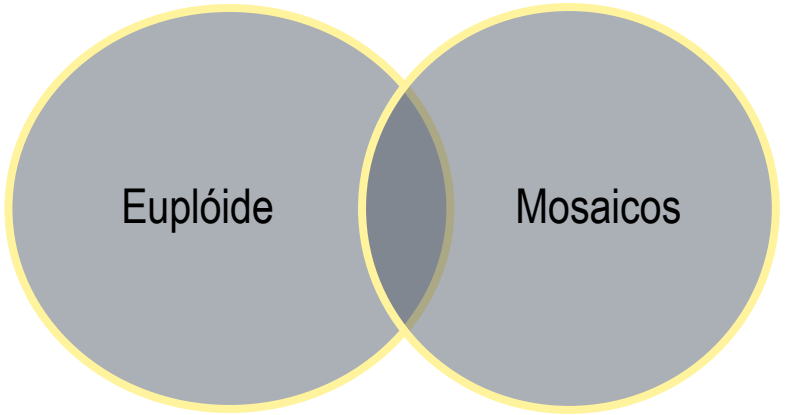
FERTILITY

- **Resultados**

382 (55,5%) aneuplóides



Sem diferença quando os três grupos foram comparados em relação aos fatores morfocinéticos



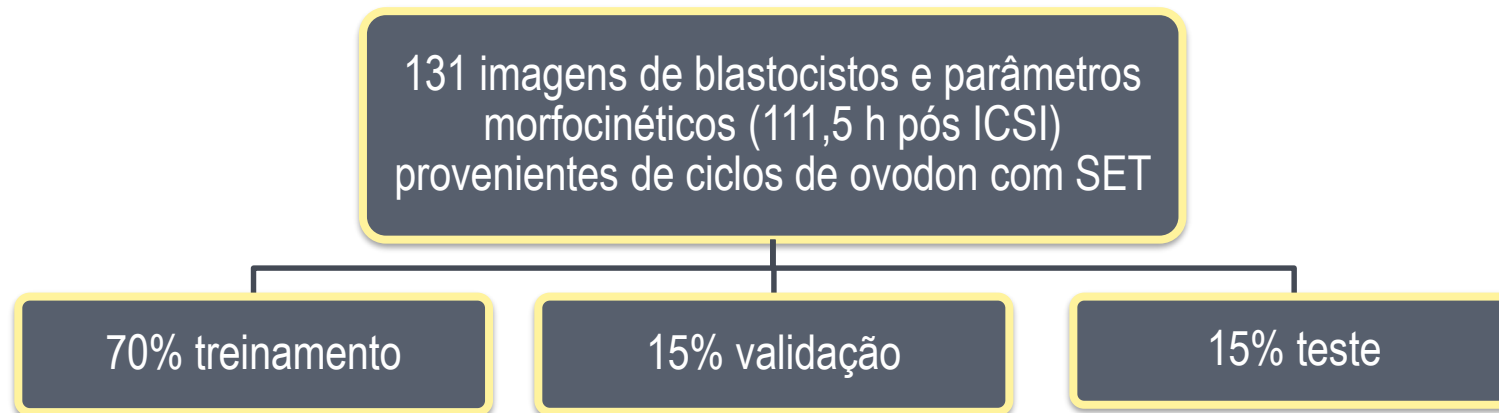
tPNf, t2, t3, t4, tSB

## O-184 Is there any room to improve embryo selection? Artificial Intelligence technology applied for live birth prediction on blastocysts

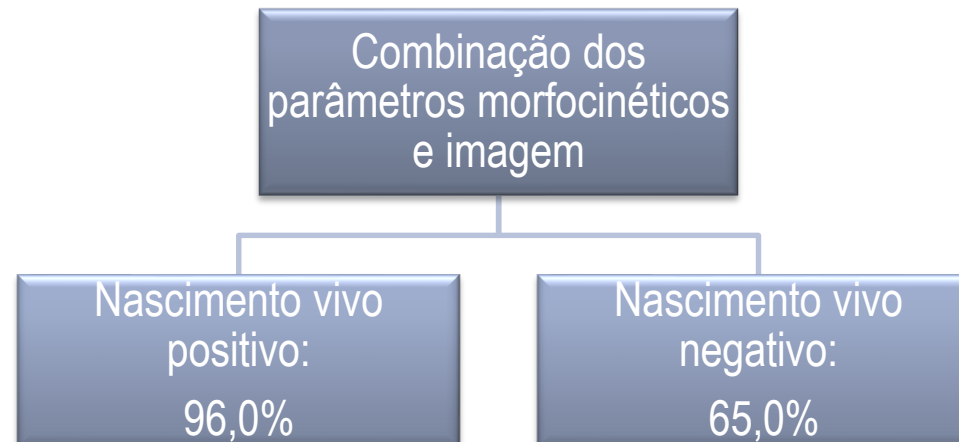
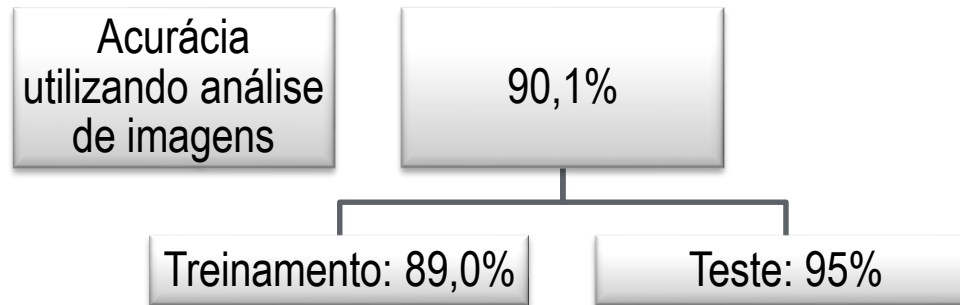
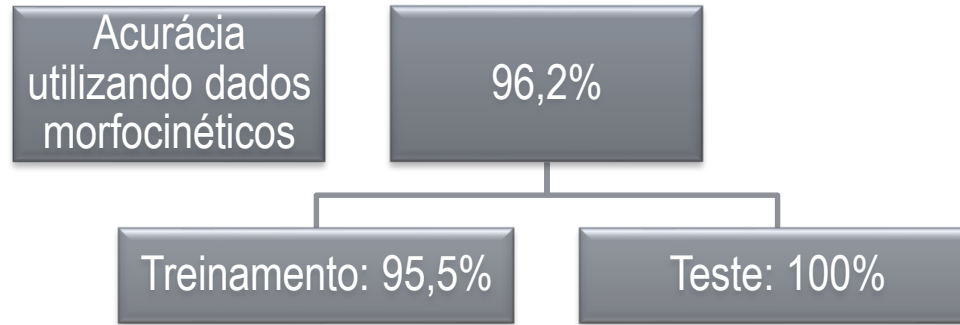
Marcos Meseguer, PhD,<sup>a</sup> Cristina Hickman, PhD,<sup>b</sup> Lorena Bori Arnal, PhD,<sup>c</sup> Lucia Alegre, PhD,<sup>c</sup> Marco Toschi, MS,<sup>c,d</sup> Raquel Del Gallego, PhD,<sup>c</sup> Jose Celso Rocha, PhD<sup>e</sup>

<sup>a</sup>IVIRMA Global, Valencia, Spain, Tel Aviv, Israel; <sup>b</sup>Imperial College London, London, United Kingdom; <sup>c</sup>IVIRMA Global, Valencia, Spain; <sup>d</sup>IVIRMA, Rome, Italy; <sup>e</sup>State University of São Paulo Júlio de Mesquita Filho, Assis, Brazil.

- **Objetivo:** aplicar a tecnologia de AI ao STL e parâmetros morfocinéticos para prever nascidos vivos.



- **Resultados**



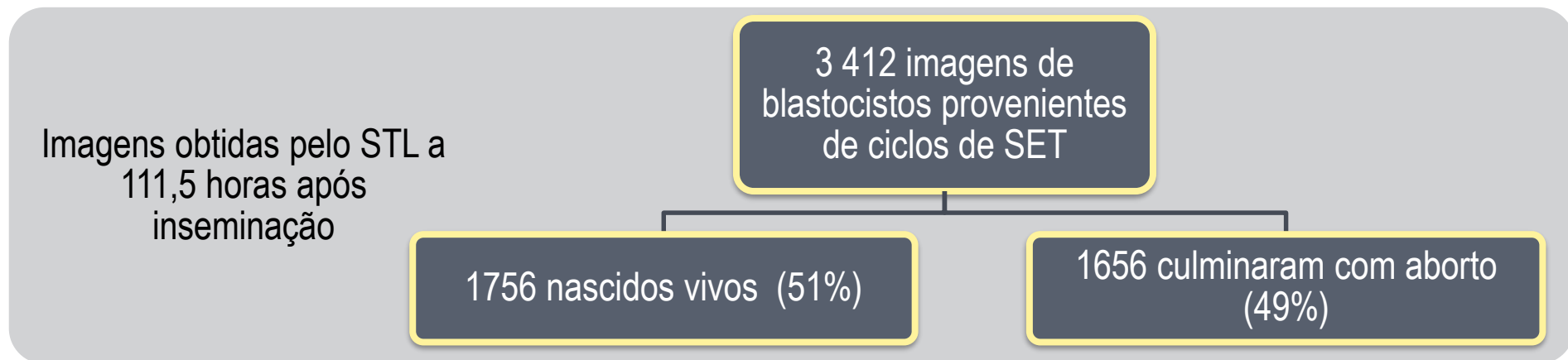
## O-91 Artificial intelligence assessment of time-lapse images can predict with 77% accuracy whether a human embryo capable of achieving a pregnancy will miscarry

Rishabh Hariharan, BSc,<sup>a</sup> Peter He,<sup>a</sup> Marcos Meseguer, PhD,<sup>b</sup> Marco Toschi, MSc,<sup>c</sup> Jose Celso Rocha, PhD,<sup>d</sup> Nikica Zaninovic, Ph.D.,<sup>e</sup> Jonas Malmsten, MSc,<sup>e</sup> Qiansheng Zhan, MSc,<sup>e</sup> Cristina Hickman, PhD<sup>a</sup>

<sup>a</sup>Imperial College London, London, United Kingdom; <sup>b</sup>IVIRMA Global, Valencia, Spain; <sup>c</sup>IVIRMA, Rome, Italy;

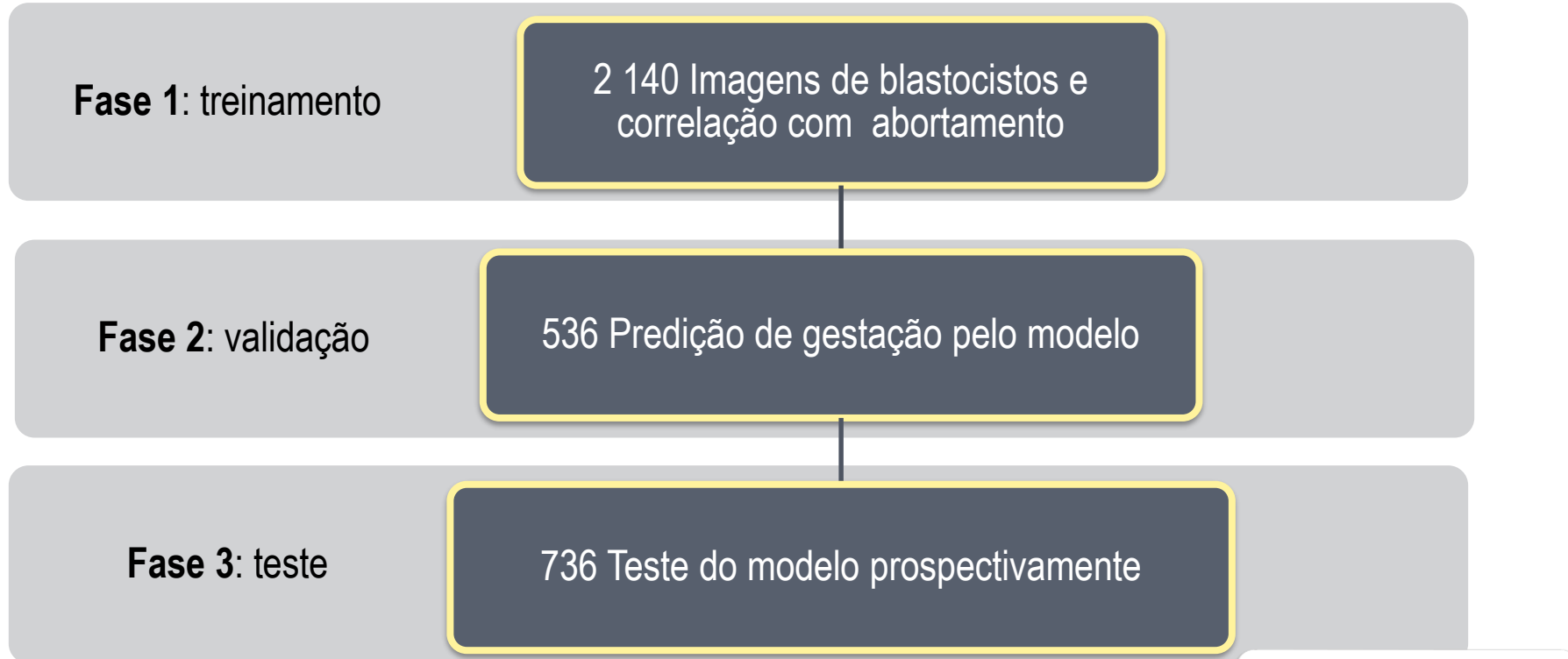
<sup>d</sup>State University of São Paulo Júlio de Mesquita Filho, Assis, Brazil; <sup>e</sup>Ronald O. Perlmán and Claudia Cohen Center for Reproductive Medicine, New York, NY.

- **Objetivo:** Avaliar a IA como uma ferramenta capaz de prever a chance de abortamento
- **Métodos**





- **Métodos**



- **Resultados**

**Validação:** AUC: 85,0%

**Teste:** AUC: 79,0%

Acurácia do teste:  
77,0%

Especificidade:  
58%

Sensibilidade :  
95%

Embriões  
classificados com  
alto risco de aborto



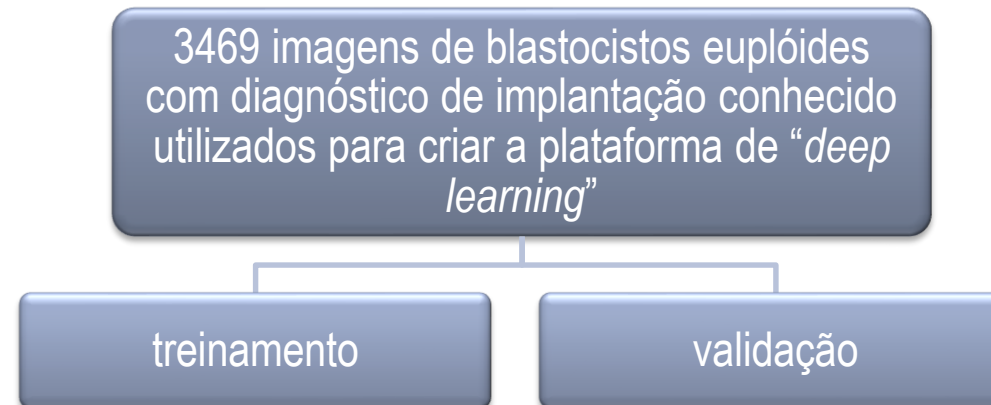
Taxa de aborto:  
92,0%

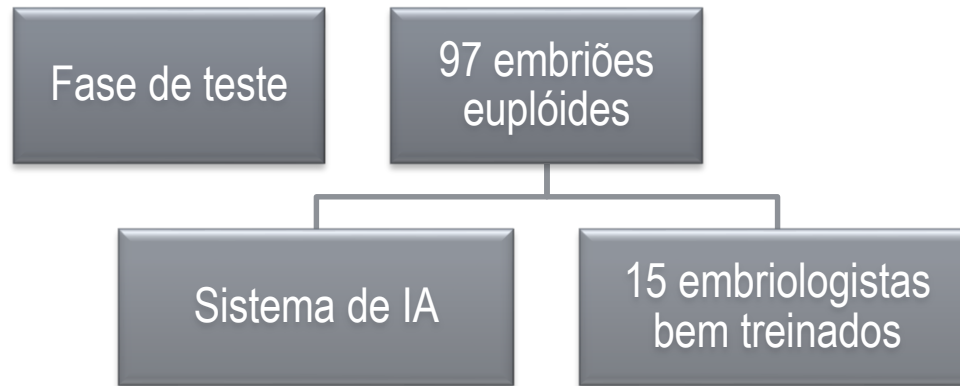
## O-185 A deep learning framework outperforms embryologists in selecting day 5 euploid blastocysts with the highest implantation potential

Eduardo Hariton, MD, MBA,<sup>a</sup> Irene Dimitriadis, MD,<sup>a</sup> Manoj Kumar Kanakasabapathy, MS,<sup>b</sup> Prudhvi Thirumalaraju, BS,<sup>b</sup> Raghav Gupta, BTech,<sup>b</sup> Rohan Pooniwala, BTech,<sup>a</sup> Irene Souter, MD,<sup>a</sup> Sarah T. Rice, MS,<sup>a</sup> Pragati Bhowmick, MD,<sup>a</sup> Leslie B. Ramirez, PhD,<sup>c</sup> Carol Lynn Curchoe, PhD, TS (ABB),<sup>d</sup> Jason E. Swain, PhD,<sup>e</sup> Lynn M. Boehnlein, BS,<sup>f</sup> Charles L. Bormann, PhD,<sup>a</sup> Hadi Shafiee, PhD.<sup>b</sup>

<sup>a</sup>Massachusetts General Hospital, Harvard Medical School, Boston, MA; <sup>b</sup>Brigham and Women's Hospital, Harvard Medical School, Boston, MA; <sup>c</sup>Extend Fertility, New York, NY; <sup>d</sup>San Diego Fertility Center, San Diego, CA; <sup>e</sup>CCRM Fertility Network, Lone Tree, CO; <sup>f</sup>Division of Reproductive Endocrinology and Infertility, Department of Obstetrics and Gynecology, University of Wisconsin, Madison, WI

- **Objetivo:** Avaliar o desempenho de um sistema de IA combinado a um algoritmo genético, para a seleção de blastocistos euplóides para a transferência





### • Resultados

|                |                   |
|----------------|-------------------|
| IA             | • Acurácia: 73,3% |
| Embriologistas | • Acurácia: 67,4% |

IA

Sensibilidade: 84,2%

Especificidade: 64,5%

Teste t



IA superior aos embriologistas bem treinados ao identificar embriões euploides com maior potencial de implantação ( $p < 0,001$ )

## P-411 Predicting blastocyst formation of day 3 embryos using a convolutional neural network (CNN): a machine learning approach

Pietro Bortoletto, MD,<sup>a</sup> Manoj Kumar Kanakasabapathy, MS,<sup>b</sup> Prudhvi Thirumalaraju, BS,<sup>c</sup> Raghav Gupta, BTech,<sup>b</sup> Rohan Pooniwala, BTech,<sup>d</sup> Irene Souter, MD,<sup>d</sup> Irene Dimitriadis, MD,<sup>e</sup> Kristy Dickinson, BS, TS,<sup>a</sup> Eduardo Hariton, MD, MBA,<sup>a</sup> Charles L. Bormann, PhD,<sup>e</sup> Hadi Shafiee, PhD.<sup>c</sup>

<sup>a</sup>Division of Reproductive Endocrinology and Infertility, Boston, MA; <sup>b</sup>Brigham and Women's Hospital, Harvard Medical School, Boston, MA; <sup>c</sup>Division of Engineering in Medicine, Cambridge, MA; <sup>d</sup>Massachusetts General Hospital, Harvard Medical School, Boston, MA; <sup>e</sup>Massachusetts General Hospital, Boston, MA.

## P-414 Artificial neural-network analysis combined with time-lapse imaging predicts embryo ability to develop to the blastocyst stage

Giovanni Coticchio, Ph.D.,<sup>a</sup> Raffaella Sciajno, B.Sc.,<sup>a</sup> Giulia Fiorentino, B.Sc.,<sup>b</sup> Federica Cavallera, Ph.D.,<sup>b</sup> Giovanna Nicora, B.Sc.,<sup>c</sup> Riccardo Bellazzi, Ph.D.,<sup>c</sup> Andrea Borini, M.D.,<sup>a</sup> Silvia Garagna, Ph.D.,<sup>b</sup> Maurizio Zuccotti, Ph.D.<sup>b</sup>

- **Objetivo:** avaliar o potencial da IA para análise de imagens de embriões em estágio de clivagem, para prever quais embriões atingem o estágio de blastocisto
- **Conclusão:** IA tem uma acurácia de 70 - 73% para prever quais embriões que atingem o estágio de blastocisto

## P-444 Deep learning-enabled smartphone-based system for automated embryo assessments and evaluation

Manoj Kumar Kanakasabapathy, MS,<sup>a</sup> Prudhvi Thirumalaraju, BS,<sup>a</sup> Charles L. Bormann, PhD,<sup>b</sup> Hemanth Kandula, BS,<sup>a</sup> Sandeep Kota Sai Pavan, BS,<sup>a</sup> Divyank Yarravarapu, BS,<sup>a</sup> Hadi Shafiee, PhD.<sup>a</sup>

<sup>a</sup>Brigham and Women's Hospital, Harvard Medical School, Boston, MA; <sup>b</sup>Massachusetts General Hospital, Harvard Medical School, Boston, MA.

- **Objetivo:** avaliar a eficiência de um aplicativo para smartphone (<\$5) para a classificação de imagens de embriões produzidos in vitro

Imagem de embriões às 113h pós inseminação

Avaliação do sistema quanto a eficácia de diferenciar embriões com base na qualidade do blastocisto

Embriões avaliados também por 10 embriologistas



• **Resultados**

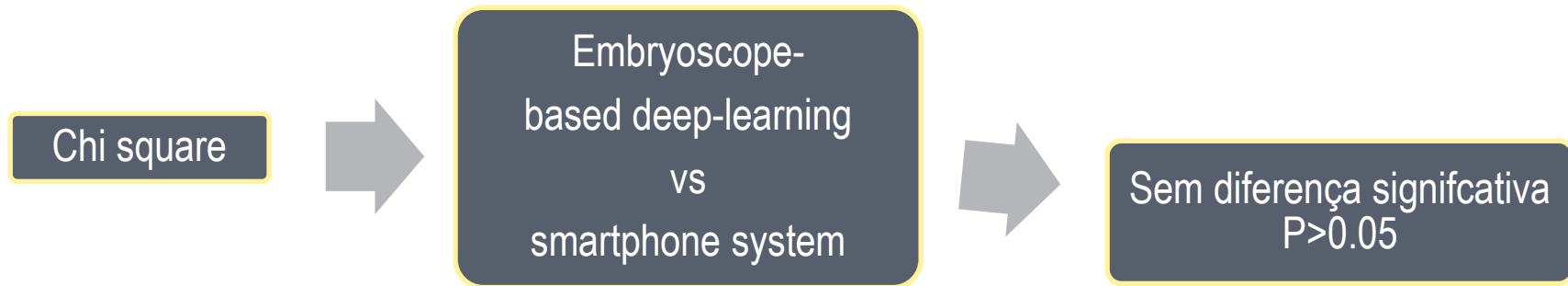
smartphone system

- Acurácia: 96,0%

smartphone system

Sensibilidade: 93,5%

Especificidade: 100%



## Deep learning as a predictive tool for fetal heart pregnancy following time-lapse incubation and blastocyst transfer

D. Tran<sup>1,\*</sup>, S. Cooke<sup>2</sup>, P.J. Illingworth<sup>2</sup>, and D.K. Gardner<sup>3</sup>

<sup>1</sup>Medical AI, Harrison AI, Barangaroo, NSW, Australia <sup>2</sup>Embryology, IVF Australia, Greenwich, NSW, Australia <sup>3</sup>Embryology, Melbourne IVF, East Melbourne, Victoria, Australia

\*Correspondence address. Harrison AI, Barangaroo, New South Wales, Australia. E-mail: Aengus@harrison.ai

**Table 1** Number of embryos, patient ages and culture media used in each laboratory.

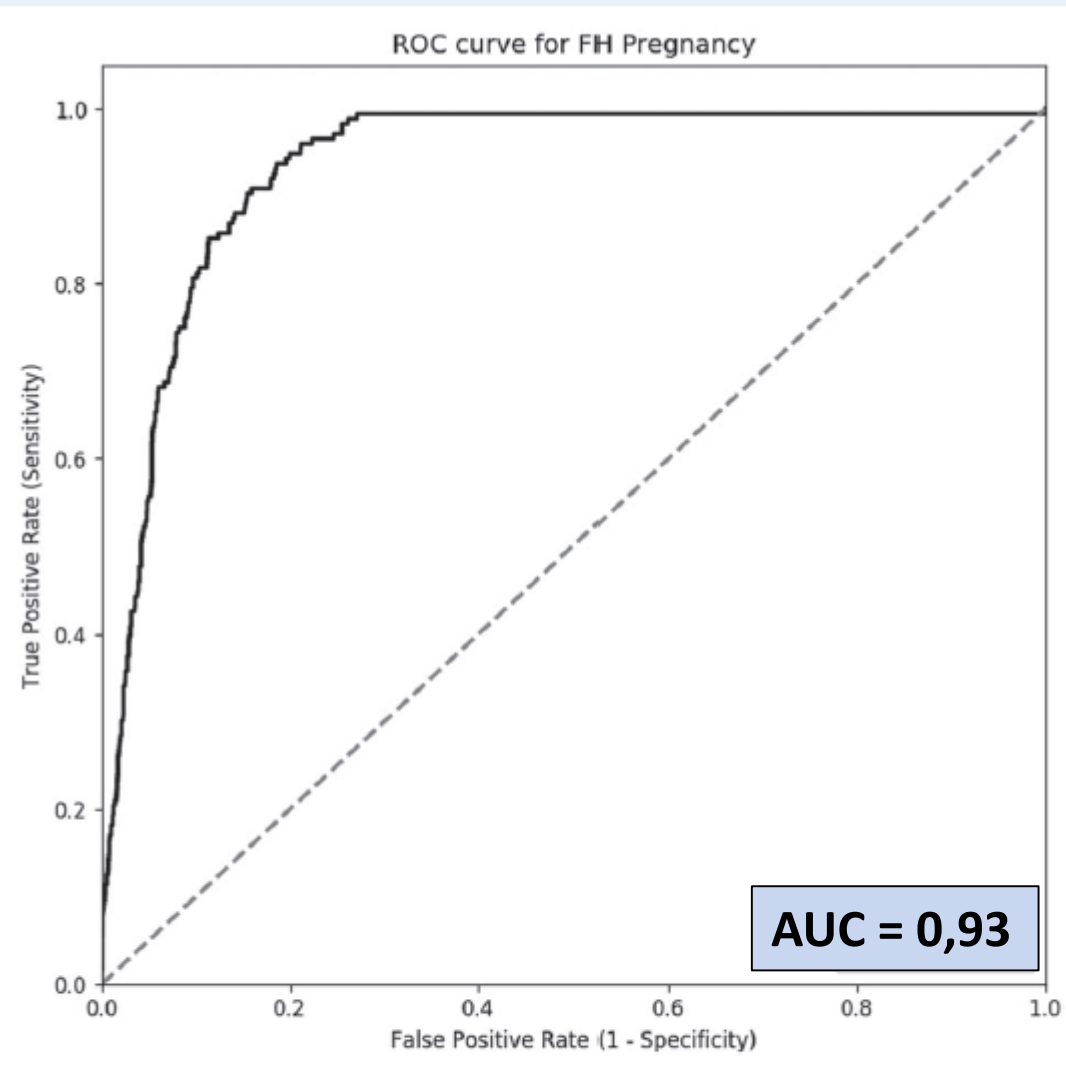
| Laboratory number | Laboratory                                       | Number of embryos studied | Mean age | Age range | Media used in the laboratory  |
|-------------------|--|---------------------------|----------|-----------|---|
| 1                 | IVFAustralia (Sydney, Australia)                 | 1264                      | 36.8     | 23–46     | Vitrolife, Sequential; Vitrolife, Single Stage (G-TL™)              |
| 2                 | IVFAustralia (Canberra, Australia)               | 150                       | 34.2     | 24–44     | Sage, Sequential  |
| 3                 | Hunter IVF (Newcastle, Australia)                | 632                       | 34.8     | 25–43     | Vitrolife, Single Stage (G-TL™)                                     |
| 4                 | Melbourne IVF (Melbourne, Australia)             | 758                       | 36.6     | 30–45     | Vitrolife, Single Stage (G-TL™)                                     |
| 5                 | Queensland Fertility Group (Brisbane, Australia) | 3827                      | 35.6     | 22–50     | Sage, Sequential; COOK, Sequential; Vitrolife, Single Stage (G-TL™) |
| 6                 | SIMS IVF (Dublin, Ireland)                       | 1454                      | 35.9     | 25–46     | Vitrolife, Single Stage (G-TL™)                                     |
| 7                 | Complete Fertility Centre (Southampton, UK)      | 915                       | 34.7     | 24–44     | Vitrolife, Sequential; Vitrolife, Single Stage (G-TL™)              |
| 8                 | Aagard Fertility (Aarhus, Denmark)               | 1683                      | 34.2     | 24–44     | Sage 1-step   |
|                   |  | <b>n=10683</b>            |          |           |   |

## Deep learning as a predictive tool for fetal heart pregnancy following time-lapse incubation and blastocyst transfer

D. Tran<sup>1,\*</sup>, S. Cooke<sup>2</sup>, P.J. Illingworth<sup>2</sup>, and D.K. Gardner<sup>3</sup>

<sup>1</sup>Medical AI, Harrison AI, Barangaroo, NSW, Australia; <sup>2</sup>Embryology, IVF Australia, Greenwich, NSW, Australia; <sup>3</sup>Embryology, Melbourne IVF, East Melbourne, Victoria, Australia

\*Correspondence address: Harrison AI, Barangaroo, New South Wales, Australia. E-mail: Atran@harrison.ai



**Figure 2** ROC curve for prediction of FH pregnancy on the testing dataset by IVY. ROC, Receiver operating characteristic; AUC, area under the curve.

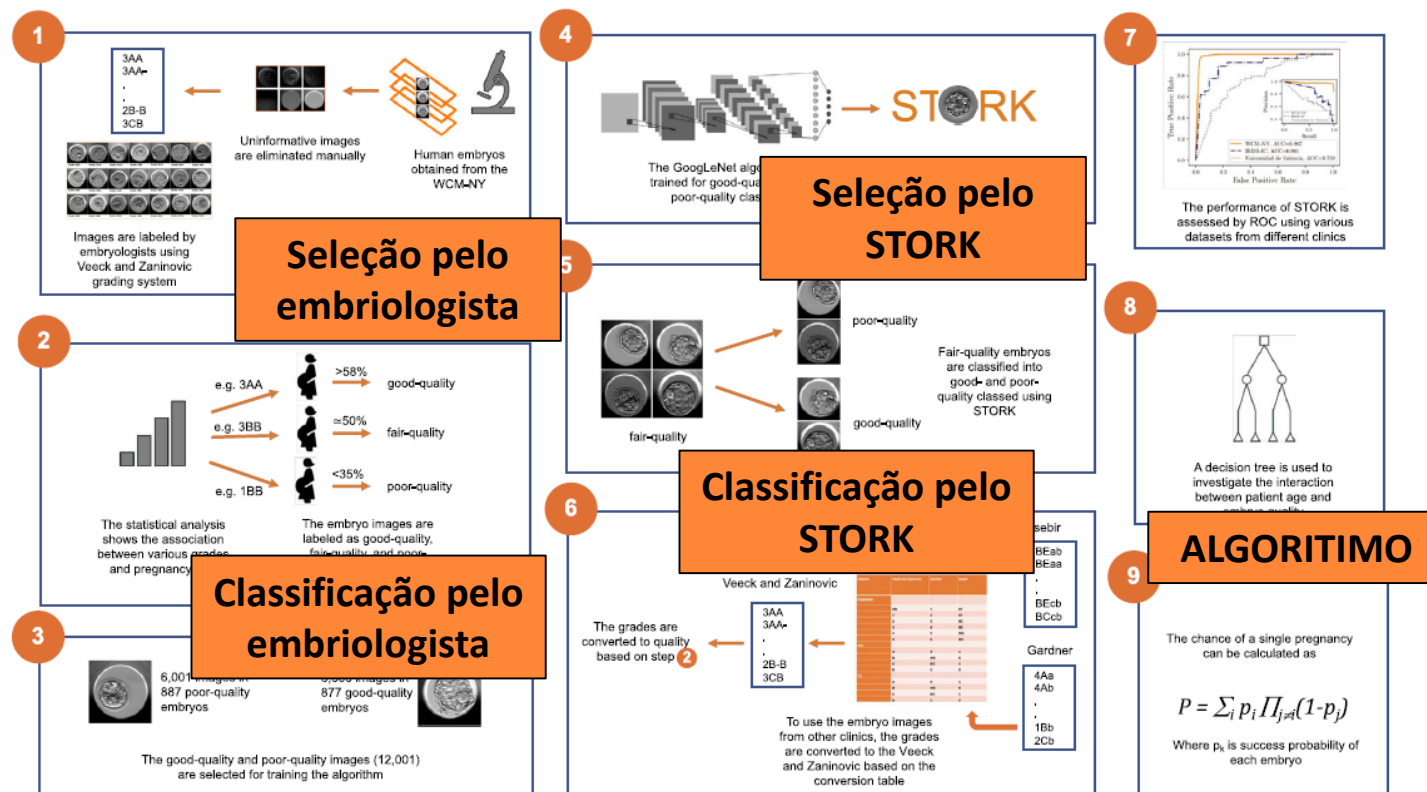


ARTICLE OPEN

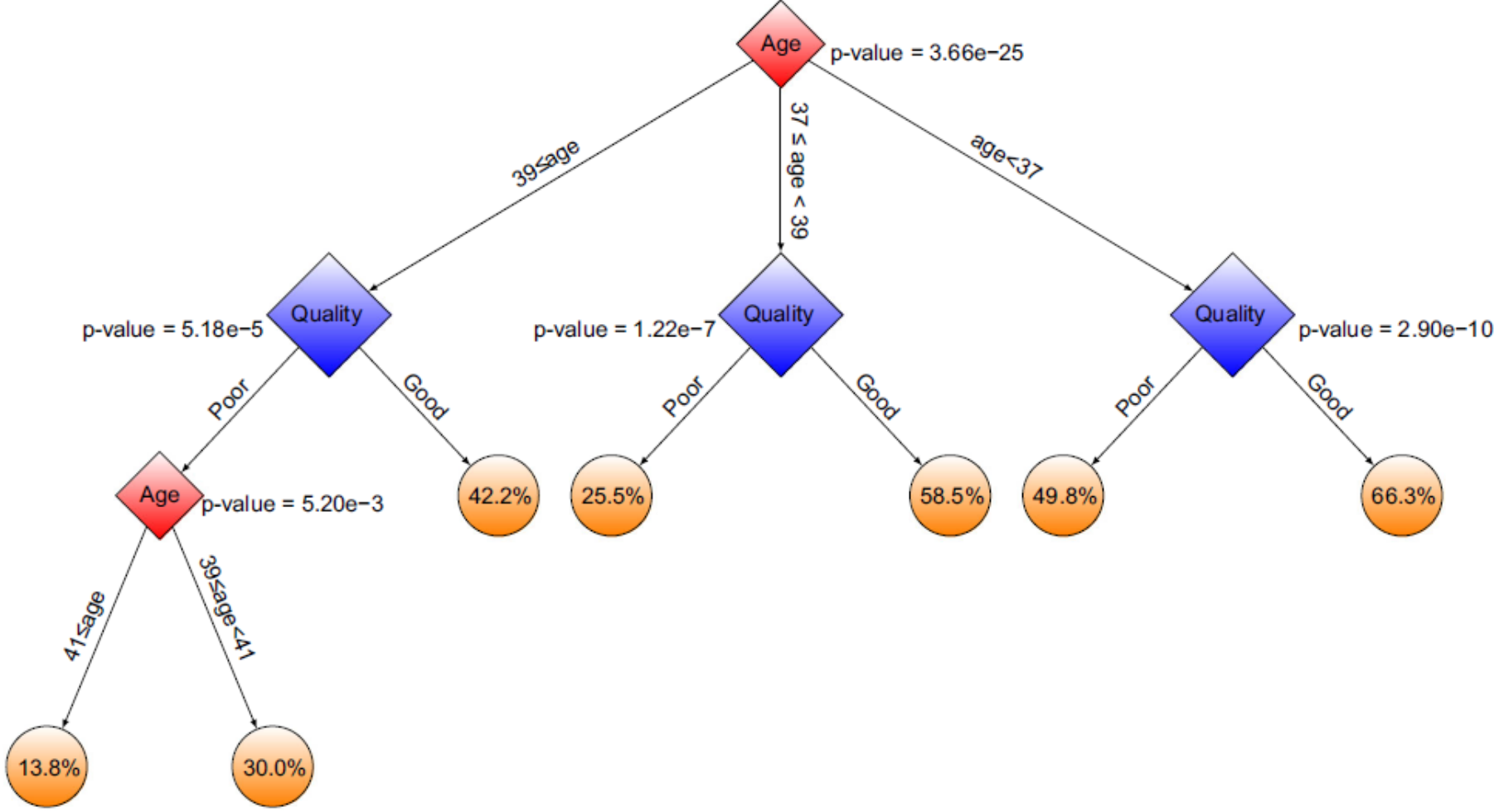
# Deep learning enables robust assessment and selection of human blastocysts after in vitro fertilization

Pegah Khosravi<sup>1,2</sup>, Ehsan Kazemi<sup>3</sup>, Qiansheng Zhan<sup>4</sup>, Jonas E. Malmsten<sup>4</sup>, Marco Toschi<sup>4</sup>, Pantelis Zsimopoulos<sup>1,2</sup>, Alexandros Sigaras<sup>1,2</sup>, Stuart Lavery<sup>5</sup>, Lee A. D. Cooper<sup>6</sup>, Cristina Hickman<sup>5</sup>, Marcos Meseguer<sup>7</sup>, Zev Rosenwaks<sup>4</sup>, Olivier Elemento<sup>1,2,8</sup>, Nikica Zaninovic<sup>4</sup> and Iman Hajirasouliha<sup>1,2</sup>

npj Digital Medicine (2019)2:21; https://doi.org/10.1038/s41746-019-0096-y



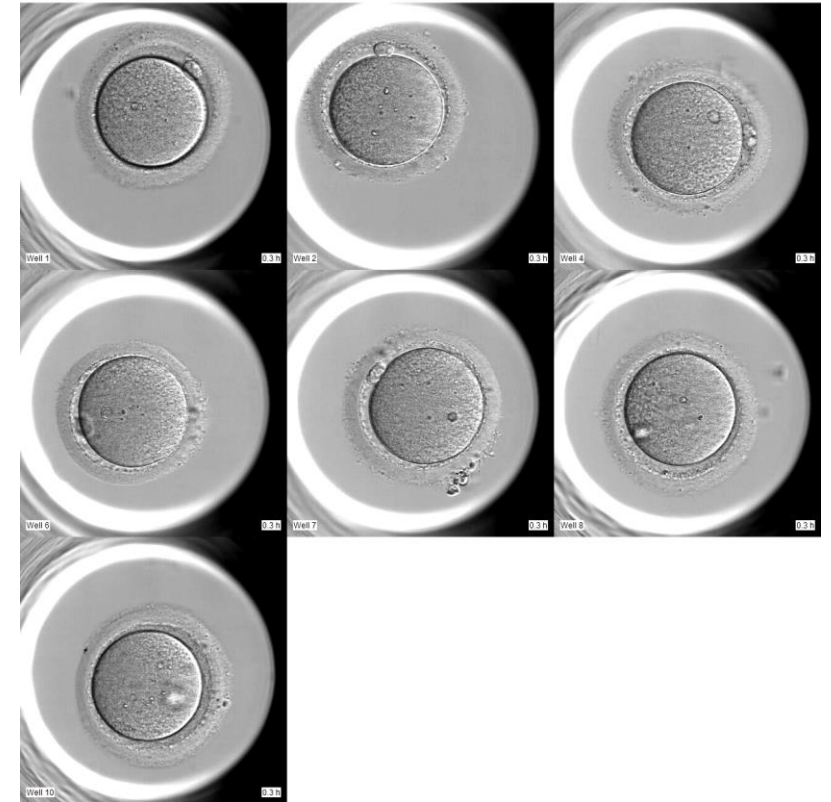
**Fig. 1** The STORK flowchart: This flowchart illustrates the design and assessment of STORK. First, Human embryo images are provided from the embryology lab and labeled by embryologists as good-quality or poor-quality based on their pregnancy likelihood. Then, the labels and clinical information from the extracted images are integrated, and the Inception-V1 algorithm is trained for good-quality and poor-quality classes. Furthermore, STORK is evaluated by a blind test set to assess its performance in predicting embryo quality. Finally, the CHAID decision tree is used to investigate the interaction between patient age and embryo quality



**Fig. 6** Interactions between age and embryo quality: The decision tree shows the interactions between IVF patient age and embryo quality using CHAID

# Embryoscope FERTILITY

- 165 ciclos
- 144 pacientes
  
- ✓ 1252 ovócitos cultivados
- ✓ 995 2PN (79,4%)
- ✓ 618 blastocistos: 62,1% 2PN
  
- 2018: 49,9% 2PN



# Embryoscope FERTILITY

## Análise discriminante de parâmetros associados à formação de blastocisto

| Cut-off | Variável     | Não blastocisto<br>(n=657) |       | Blastocisto<br>(n=563) |      | p-value |
|---------|--------------|----------------------------|-------|------------------------|------|---------|
|         |              | Média                      | DP    | Média                  | DP   |         |
|         | tPNa         | 7,36                       | 4,03  | 6,57                   | 2,04 |         |
|         | tPNf         | 24,35                      | 5,24  | 22,90                  | 6,02 |         |
|         | t2           | 27,26                      | 5,33  | 25,29                  | 3,19 | <0.001  |
|         | S1 (t2-tPNf) | 19,90                      | 3,68  | 18,71                  | 2,82 |         |
|         | t3           | 36,50                      | 6,79  | 36,02                  | 4,65 |         |
|         | cc2 (t3-t2)  | 9,24                       | 5,22  | 10,74                  | 3,10 |         |
|         | t4           | 39,74                      | 7,29  | 37,46                  | 4,43 |         |
|         | s2 (t4-t3)   | 3,24                       | 4,64  | 1,43                   | 2,69 | <0.001  |
|         | t5           | 48,30                      | 9,59  | 48,77                  | 7,15 |         |
|         | cc3 (t5-t3)  | 11,80                      | 6,68  | 12,75                  | 4,62 |         |
|         | t6           | 53,28                      | 10,44 | 51,55                  | 7,02 |         |
|         | t7           | 57,34                      | 11,62 | 54,21                  | 8,40 | <0.001  |
|         | t8           | 62,06                      | 13,07 | 57,25                  | 9,51 |         |
|         | s3 (t8-t5)   | 13,75                      | 10,05 | 8,48                   | 7,84 | <0.001  |

# Embryoscope FERTILITY

## Análise discriminante de parâmetros associados à formação de blastocisto

| Cut-off | Variável     | Não blastocisto<br>(n=657) |       | Blastocisto<br>(n=563) |      | p-value |
|---------|--------------|----------------------------|-------|------------------------|------|---------|
|         |              | Média                      | DP    | Média                  | DP   |         |
|         | tPNa         | 7,36                       | 4,03  | 6,57                   | 2,04 |         |
|         | tPNf         | 24,35                      | 5,24  | 22,90                  | 6,02 |         |
| 26,27   | t2           | 27,26                      | 5,33  | 25,29                  | 3,19 | <0.001  |
|         | S1 (t2-tPNf) | 19,90                      | 3,68  | 18,71                  | 2,82 |         |
|         | t3           | 36,50                      | 6,79  | 36,02                  | 4,65 |         |
|         | cc2 (t3-t2)  | 9,24                       | 5,22  | 10,74                  | 3,10 |         |
|         | t4           | 39,74                      | 7,29  | 37,46                  | 4,43 |         |
| 2,34    | s2 (t4-t3)   | 3,24                       | 4,64  | 1,43                   | 2,69 | <0.001  |
|         | t5           | 48,30                      | 9,59  | 48,77                  | 7,15 |         |
|         | cc3 (t5-t3)  | 11,80                      | 6,68  | 12,75                  | 4,62 |         |
|         | t6           | 53,28                      | 10,44 | 51,55                  | 7,02 |         |
| 55,78   | t7           | 57,34                      | 11,62 | 54,21                  | 8,40 | <0.001  |
|         | t8           | 62,06                      | 13,07 | 57,25                  | 9,51 |         |
| 11,12   | s3 (t8-t5)   | 13,75                      | 10,05 | 8,48                   | 7,84 | <0.001  |

76,1% de casos originais agrupados corretamente classificados

# Embryoscope FERTILITY

| ICSI                      |                      |        |                    |        |                  |
|---------------------------|----------------------|--------|--------------------|--------|------------------|
| Variáveis                 | Convencional (n=728) |        | Embryoscope (n=89) |        | p                |
|                           | Média                | DP     | Média              | DP     |                  |
| IdadePaciente             | 37,4                 | 3,4    | 37,4               | 4,1    | 0,774            |
| IMC                       | 24,6                 | 4,3    | 24,7               | 4,1    | 0,914            |
| FSH (UI)                  | 2658,3               | 671,6  | 2751,5             | 676,9  | 0,131            |
| E2 (pg/mL)                | 2057,3               | 1936,0 | 1777,4             | 1863,3 | 0,219            |
| Folículos puncionados (n) | 13,5                 | 13,2   | 14,1               | 15,8   | 0,645            |
| Oócitos obtidos (n)       | 9,8                  | 9,5    | 10,4               | 10,8   | 0,469            |
| yield (%)                 | 69,9                 | 24,0   | 73,2               | 23,5   | 0,099            |
| MII (n)                   | 7,3                  | 7,2    | 7,4                | 7,8    | 0,861            |
| Taxa de MII (%)           | 71,3                 | 23,9   | 73,2               | 22,7   | 0,356            |
| Taxa de fertilização (%)  | 76,3                 | 25,1   | 72,3               | 27,8   | 0,054            |
| Taxa de blastocisto (%)   | 58,0                 | 24,9   | 67,4               | 22,7   | <b>&lt;0,001</b> |
| Embriões transferidos (n) | 2,0                  | 0,7    | 1,0                | 1,0    | <b>&lt;0,001</b> |
| Taxa de implantação (%)   | 22,8                 | 35,9   | 20,7               | 36,6   | 0,668            |
| Taxa de gestação (%)      | 34,5                 |        | 40,0               |        | 0,360            |
| Taxa de aborto (%)        | 11,9                 |        | 0,0                |        | <b>0,050</b>     |



# Embryoscope FERTILITY

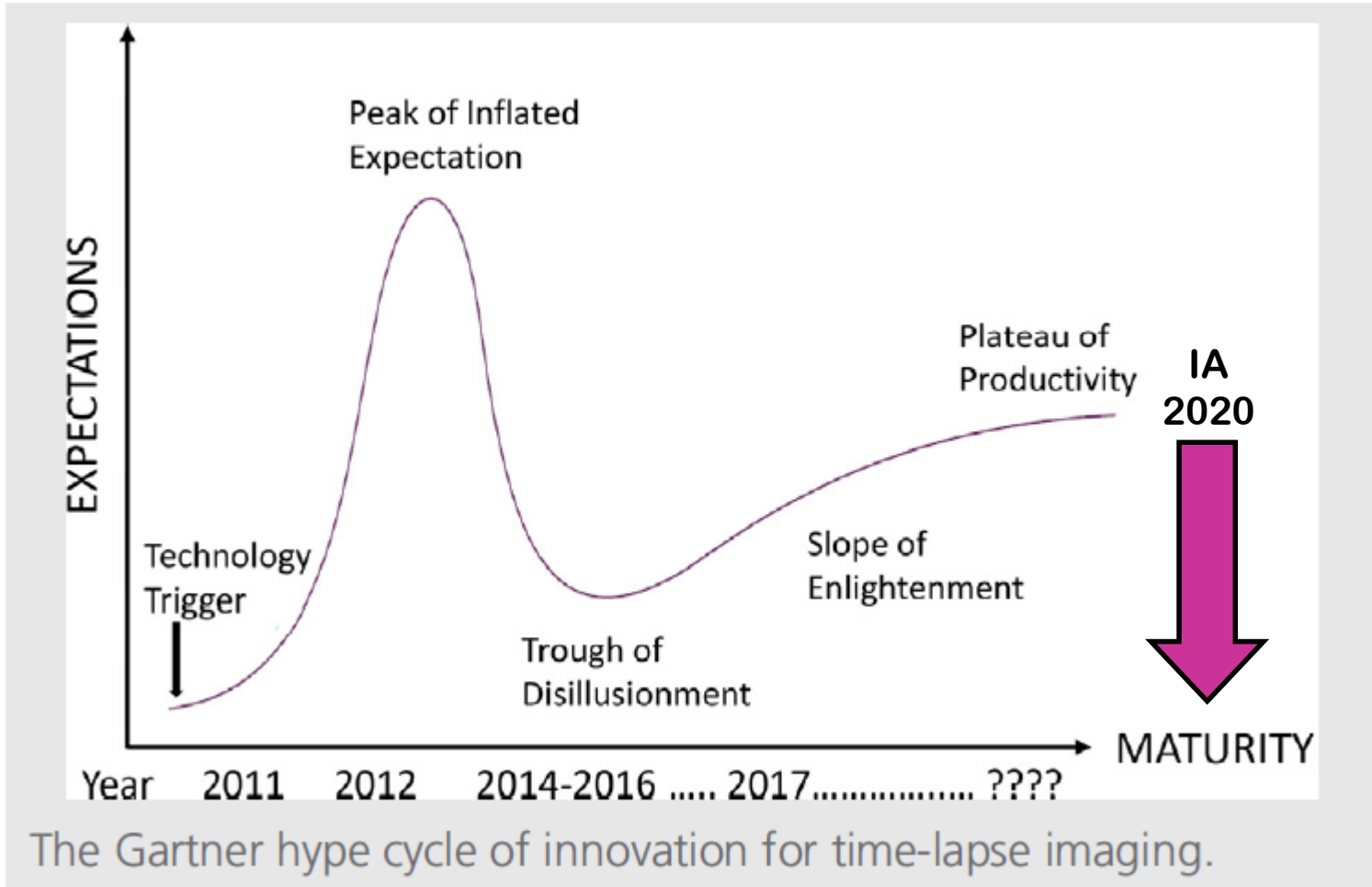
| OVODON                    |                     |      |                    |      |              |
|---------------------------|---------------------|------|--------------------|------|--------------|
| Variáveis                 | Convencional (n=36) |      | Embryoscope (n=30) |      | p            |
|                           | Média               | DP   | Média              | DP   |              |
| IdadePaciente             | 44,4                | 5,0  | 42,5               | 3,4  | <b>0,009</b> |
| Oócitos injetados (n)     | 5,9                 | 1,5  | 6,1                | 1,6  | 0,504        |
| Taxa de fertilização (%)  | 78,4                | 24,1 | 80,4               | 21,8 | 0,608        |
| Taxa de blastocisto (%)   | 70,1                | 23,6 | 63,1               | 30,8 | 0,386        |
| Embriões transferidos (n) | 1,9                 | 0,5  | 1,7                | 0,5  | 0,202        |
| Taxa de implantação (%)*  | 38,3                | 44,5 | 44,2               | 35,6 | 0,195        |
| Taxa de gestação (%)*     | 46,7                |      | 68,8               |      | <b>0,021</b> |
| Taxa de aborto (%)*       | 15,4                |      | 5,6                |      | 0,222        |

# Embryoscope FERTILITY

## ICSI e OVODON

| Variáveis                 | Convencional (n=764) |      | Embryoscope (n=119) |      | p                |
|---------------------------|----------------------|------|---------------------|------|------------------|
|                           | Média                | DP   | Média               | DP   |                  |
| Taxa de fertilização (%)  | 76,5                 | 25,0 | 74,4                | 26,5 | 0,255            |
| Taxa de blastocisto (%)   | <b>59,2</b>          | 25,0 | <b>66,0</b>         | 25,4 | <b>0,003</b>     |
| Embriões transferidos (n) | <b>2,0</b>           | 0,6  | <b>1,2</b>          | 0,9  | <b>&lt;0,001</b> |
| Taxa de implantação (%)*  | <b>24,5</b>          | 37,3 | <b>36,4</b>         | 42,2 | <b>0,006</b>     |
| Taxa de gestação (%)*     | <b>34,6</b>          |      | <b>55,7</b>         |      | <b>&lt;0,001</b> |
| Taxa de aborto (%)*       | <b>11,5</b>          |      | <b>2,3</b>          |      | <b>0,001</b>     |





FERTILITY

# Obrigado !

**Edson Borges Jr.**

[edson@fertility.com.br](mailto:edson@fertility.com.br)

**Daniela Braga**

[dbraga@fertility.com.br](mailto:dbraga@fertility.com.br)