

**Sicurezza, blockchain,  
business continuity e  
flessibilità:  
la PMA a prova di  
guerre, pandemie,  
disastri e traslochi**

Dr. Lodovico Parmegiani, PhD



**Next Fertility**  
GynePro

# Affiliation and Disclosures

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## Lodovico Parmegiani

- Head of Embryology, NextClinics International
- Director, IVF Laboratory Next Fertility GynePro, Bologna-Italy
- Founder and shareholder of:
  - Nterilizer, Italy
- reports fees during 2022 from:
  - Origio - Coopersurgical, Denmark-USA
  - Biopsybell, Italy



# **Sicurezza:** **Automatic** **Witness** **System**

# Problema: Mismatch – Scambio Campioni Biologici



## IVF mix-up: 'I fear my son will feel he is a mistake'

By Andrew Buncombe

Tuesday, 9 July 2002

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Koen and Tuen Stuart are brothers. They are loved equally loved by their legal parents, Wilma and Willem, who had fertility treatment in 1993 at the Academic Hospital in Utrecht in order to have them. But a failure properly to sterilise a pipette meant that during the treatment Mrs Stuart was impregnated with both the sperm of her husband and that of a black man who was also a patient at the centre. The result is that the boys have different fathers. Koen is black, while Tuen, like the Stuarts, is white.



The clinic mixed donor samples  
A judge may have to decide what happens to black twins born to a white couple after an apparent



He was known only as donor number 3168, a laboratory identity with flesh-and-blood consequences.  
Three years ago, Trudy Moore found that her daughter, Samantha, conceived using her husband's sperm and her sister as a surrogate, was not a genetic match to her husband. Frantic for answers, she confronted her doctor, who suggested in e-mails to Ms. Moore that he may have contaminated her husband's sample – possibly with 3168.



Artificial insemination: Procedure fraught with difficulties  
A white woman who gave birth to two boys – one black, one white – due to a test-tube baby mix-up, has agreed to return the black child to his biological parents.  
The fertility clinic in New York which accidentally implanted the woman with embryos belonging to another couple as well as with her own has been heavily criticised and now faces legal action.

Il “mismatch” di campioni biologici è un danno grave per i centri PMA (HFEA, Regno Unito)

Caso A – “Mix-up” seme utilizzato per inseminazione. Mancato passaggio di consegne tra un turno ed il successivo in laboratorio

Caso B - Sei ovociti inseminati col seme sbagliato. Mancata testimonianza sulla seconda piastra della ICSI

Caso C – Utilizzato seme sbagliato. Errore nella testimonianza

Caso D – Embrioni sbagliati trasferiti al paziente. Errore testimonianza

Caso E – Embrioni sbagliati scongelati e trasferiti alla paziente. Mancanza di testimone

Caso F – I risultati dei test genetici sono stati erroneamente trasferiti al laboratorio che ha poi scartato gli embrioni normali e trasferito alla paziente quelli anomali

Can you find **the**  
**the** mistake?

1 2 3 4 5 6 7 8 9

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# Dutch medical centre investigates suspected IVF sperm mix-up involving 26 women

1 Comment

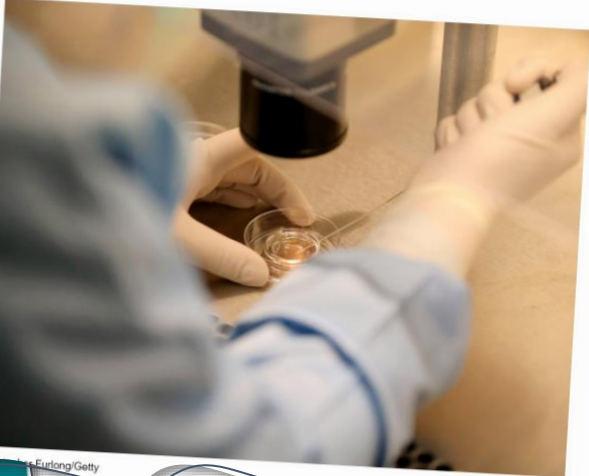


NATIONAL POST

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# Switched embryos and wrong sperm: IVF mix-ups lead to babies born with 'unintended parentage'

*Such calamities are rare and while the body representing Canada's fertility industry says it is unaware of any cases here, there have been several reports of mix-ups in the U.S.*



© Eurlong/Getty

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Wednesday, Jun 21

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# Singapore court denies full compensation to woman in IVF mix-up

By AFP PUBLISHED: 14:03, 22 March 2017 | UPDATED: 14:03, 22 March 2017

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© AFP

In a long-running lawsuit in Singapore that began in 2012, a woman sued a private hospital, a fertility clinic and two fertility doctors after she was inseminated with the wrong sperm.

A Singaporean woman inseminated with a stranger's sperm in a startling in-vitro fertilisation (IVF) mistake cannot be compensated in full for raising the child, the state's top court ruled Wednesday.

BBC NEWS

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# News From Elsewhere

## Italy: Custody battle over IVF mix-up babies

By News from Elsewhere...  
...media reports from around the world, found by BBC Monitoring

8 August 2014

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© THINKSTOCK

Twin babies born this week in Italy are at the centre of an unprecedented custody battle after an apparent blunder at a fertility clinic in Rome.

The biological parents of the children are hoping that the courts will rule in their favour after their embryos were implanted into a different couple during an in vitro fertilization procedure at the end of last year, the Italian edition of **The Local news website reports**. The biological parents' own IVF treatment ended in failure, but DNA tests later showed that they were the biological parents of twins born this week by another woman.

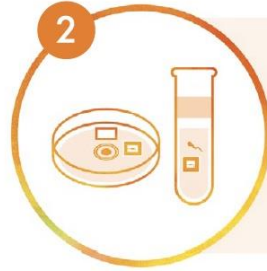
Morning Mix

# They thought their embryo didn't take. Then their son was born to a stranger across the country, lawsuit claims.

# Soluzione – Witness Automatico



1 A ciascun paziente viene assegnata una carta d'identità o un codice personale univoco

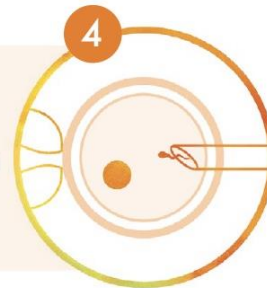


2 I tag ID contenenti questo codice personale univoco vengono fissati alla struttura in plastica che ospita i campioni del paziente



3 Ogni area del laboratorio rileva i segnali wireless inviati da questi tag ID.

Essi vengono identificati, tracciati e registrati lungo ciascun passaggio del processo ART



4 RI Witness conferma l'identità dei campioni e consente agli embriologi di procedere con l'inseminazione



5 Nel caso improbabile di un errore dei campioni, il sistema avverte l'embriologo, arresta i processi e previene qualsiasi errore



6 Prima di trasferire l'embrione, la scheda ID del paziente viene controllata in maniera automatica con la piastra dell'embrione taggato









**Sicurezza:**  
**Vitrificazione**  
**Personalizzata**  
**Virus-Free**  
**Blockchain**



**Next Fertility**  
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# Azoto Liquido – (Liquid Nitrogen - LN<sub>2</sub>)



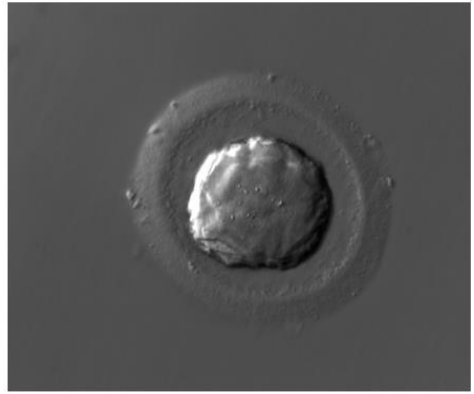
*Tedder et al, Lancet 1995. Morris, Cryobiology 2005. Borges et al, JARG 2020.*

## Agente criogenico per il raffreddamento e il congelamento nel Food & Beverage, Healthcare

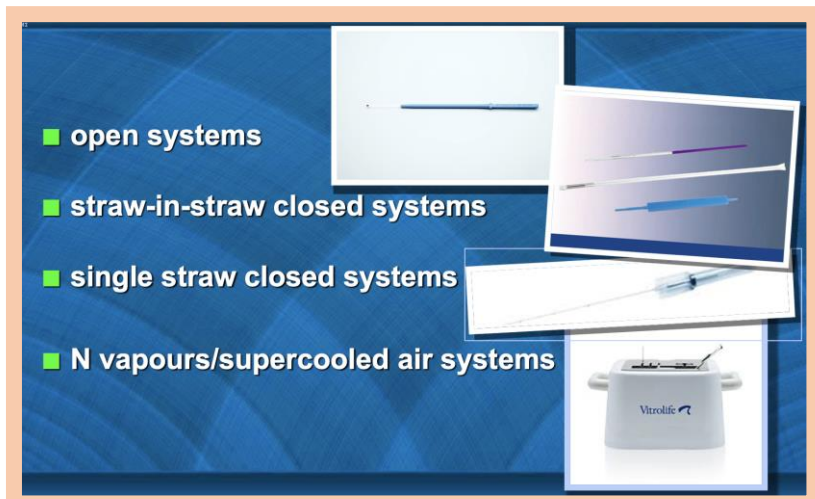
- LN<sub>2</sub> si può contaminare: sono stati trovati contaminanti nelle criobanche contenenti cellule e tessuti
  - virus, batteri, funghi
- la contaminazione crea rischi per i campioni biologici, i pazienti e gli operatori
  - Nel 1995, 6 pazienti sono state infettate da HBV in seguito a trapianto di midollo osseo e staminali del sangue contaminati da LN<sub>2</sub> in una criobanca
- Alcune applicazioni richiedono LN<sub>2</sub> sterile
  - Procreazione Medicalmente Assistita (PMA)
  - Vitirificazione, riscaldamento e crioconservazione
  - Costo della contaminazione nella PMA: 100 milioni USD/anno

# Vitrificazione

*Luyet, Biodynamica 1937,1:1-14 ; Leibo et al, Cryobiology 1978,15:257-71; Mazur et al, Cryobiology 2005,51:29-53*



- Conversione di un liquido super viscoso in uno stato vetroso quando viene raffreddato al di sotto della sua temperatura di transizione vetrosa
  - *Fahy et al, Cryobiology 1987,24:196-13*
- Qualsiasi materiale può vetrificare, in base a:
  - viscosità, velocità di raffreddamento e volume del campione
  - *Yavin e Arav, Theriogenology 2007,67:81-9; Vajta e Kuwayama, Theriogenology 2006,65:236-44*
- La vitrificazione delle cellule riproduttive umane è incredibilmente efficiente e viene eseguita con specifici «carriers»
  - Sopravvivenza: **99%** embrioni – **90%** ovociti
    - *Kuwayama et al, RBMO 2005*



# Rischio di infezione

Parmegiani, Fertil Steril 2011. Pomeroy et al, Fertil Steril 2009. Parmegiani, Hum Reprod 2020.

thebmj

covid-19

Research ▾

Education ▾

Re: Covid-19: Airborne transmission is being underestimated, and Covid-19 in Liquid Nitrogen is a potential threat

Human assisted reproductive technology (ART) is the only medical discipline where human gametes and embryos with potential to produce live births are routinely stored in LN<sub>2</sub>/NV. Many embryo/oocyte cryopreservation techniques utilize “open” cryo-devices with direct contact with LN<sub>2</sub>/NV during cooling. Even with “closed” systems, accidental contact with LN<sub>2</sub>/NV may occur during storage and warming of material. The fact that infections traceable to cryostorage have not been reported after millions of embryo transfers may be due to innate immunity in the female reproductive tract and reduced dosage of infective agents during laboratory procedures. However, the risk of infection is real, especially when new, highly infective agents arise. Airborne contaminants come in contact with LN<sub>2</sub>/NV and remain cryopreserved [3]. Although some industrial sectors (drug manufacturing, food and beverage sterile packaging) carry out raw filtration of LN<sub>2</sub> before use, this does not guarantee sterility, and it is not effective against smaller microorganisms.

Parmegiani, Vajta and Alikani - British Medicine Journal 2020

## Contaminazione mediata da azoto liquido

- Anche con sistemi “chiusi”, durante lo stoccaggio e il riscaldamento del materiale può verificarsi un contatto accidentale con LN<sub>2</sub>/NV
- Il vero rischio non è legato ai sistemi di vitrificazione, ma all'azoto liquido e ai vapori di azoto (LN<sub>2</sub>/NV) stessi. Una scatola con 2 litri di LN<sub>2</sub> può contaminare piani di lavoro, operatori, cellule e pazienti

# Manipolazione e trasporto di cellule/tessuti riproduttivi

Parmegiani et al, Current Trends in Clinical Embryology 2017

van Doremalen et al, NEJM 2020; Burke et al, J Dermatol Surg Oncol 1986.

van der Hoek et al, Plos One Medicine 2005

L. Parmegiani et al.

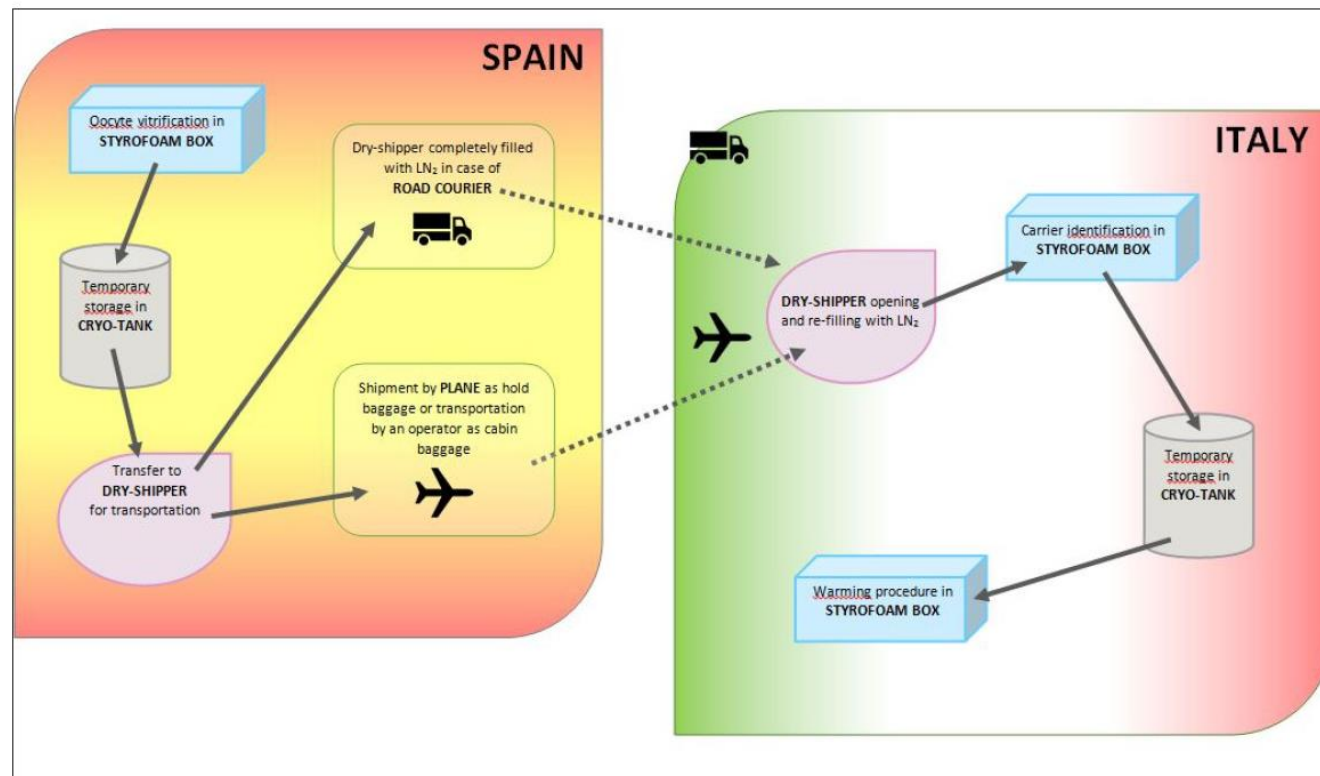
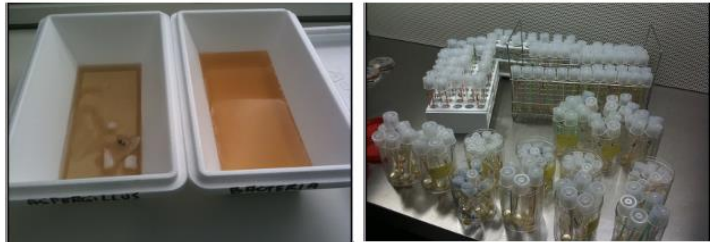
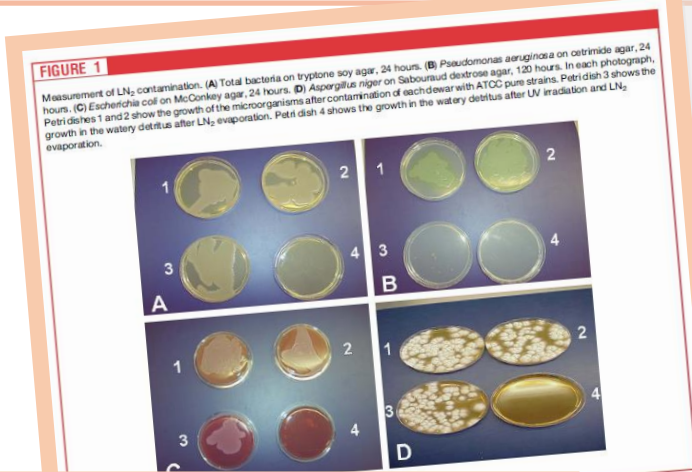


Figure 1 - Oocyte handling for transportation and warming.

## Covid-19 ed altri virus in LN<sub>2</sub>/NV: una potenziale bomba a orologeria?

- I contaminanti trasportati dall'aria entrano in contatto con LN<sub>2</sub>/NV e rimangono crioconservati
- L'uso di LN<sub>2</sub>/NV contaminati rischia il risveglio del virus e la contaminazione delle cellule in scongelamento, dell'ambiente e degli operatori

# Sterilizzazione LN<sub>2</sub>/NV Lavaggio Carriers con LN<sub>2</sub> sterile



Contaminants in Liquid Nitrogen. Parmegiani, Fertil Steril 2012

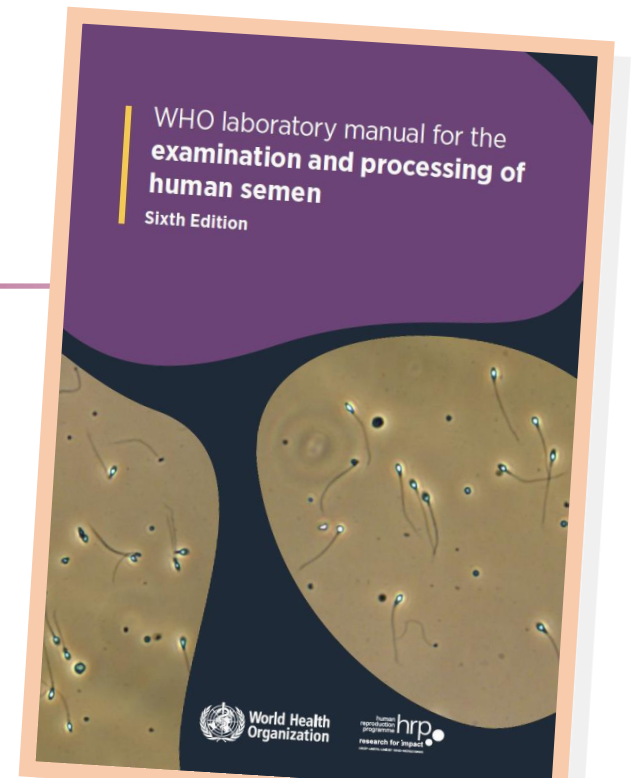
**A reliable procedure for decontamination before thawing of human specimens cryostored in liquid nitrogen: three washes with sterile liquid nitrogen (SLN<sub>2</sub>)**

- La luce ultravioletta UV-C sterilizza LN<sub>2</sub> da qualsiasi contaminante
- HIV, Epatite, Coronavirus, etc (EG epatite : 8,000 UV  $\mu$ Ws/cm<sup>2</sup>)
  - *Parmegiani et al, Hum Reprod 2009; Darnell et al Transfusion 2006*
- E' possibile sterilizzare facilmente piccole quantità di LN<sub>2</sub> prima dell'uso
  - *Parmegiani et al, RBMO 2010*
- E' possibile eseguire la vitrificazione in modo sicuro ed asettico
  - *Parmegiani et al, RBMO2011; Parmegiani and Rienzi, Hum Reprod 2011*
- Un lavaggio delle cellule con LN<sub>2</sub> sterile prima dello scongelamento riduce il rischio di contaminazione
- La certificazione del lotto sterile di LN<sub>2</sub> utilizzato per la procedura di lavaggio è una traccia attendibile per
  - Sistema Gestione Qualità / legislazioni stringenti

# Raccomandazioni – Linee guida

Recentemente molti autori hanno suggerito di implementare pratiche di "good manufacturing" nella PMA tra cui:

- **L'utilizzo di contenitori di vitrificazione personalizzati monouso**
  - *Maggiulli et al., RBMO 2020*
- **La sterilizzazione di LN<sub>2</sub> prima dell'uso**
  - *Arav et al., JARG 2020; Alteri et al., Hum Reprod 2020*
- **Il lavaggio dei campioni crioconservati con LN<sub>2</sub> sterile prima dello scongelamento**
  - *Hickman et al., RBMO 2020; Shapiro et al., RBMO 2020*
- **Precauzioni per un uso sicuro di LN<sub>2</sub>**
  - *Pomeroy and Schiewe, JARG 2020; Scarica et al JARG 2021; Vajta et al Hum Reprod 2022*
- **Anche il WHO suggerisce la sterilizzazione di LN<sub>2</sub> e la decontaminazione dei campioni crioconservati prima dello scongelamento**
  - *WHO laboratory manual for the examination and processing of human semen - Sixth edition 2021*



# Blockchain

- La Blockchain sfrutta le caratteristiche di una rete informatica di nodi e consente di gestire e aggiornare, in modo univoco e sicuro, un registro contenente dati e informazioni in maniera aperta, condivisa e distribuita senza la necessità di un'entità centrale di controllo e verifica.
- Nel settore sanitario, la Blockchain può diventare uno strumento per affrontare le sfide relative alla condivisione di dati sensibili e alla tracciabilità delle procedure mediche e di laboratorio.

A graphic logo for Blockchain. It features a large, stylized letter 'N' in a light green color, set against a white background. The 'N' is composed of thick red lines connecting four red circular nodes. The nodes are positioned at the top-left, top-right, bottom-left, and bottom-right corners of the 'N' shape. Below the 'N' graphic, the word 'BLOCKCHAIN' is written in a bold, red, italicized sans-serif font. The entire graphic is enclosed in a light green rectangular border.

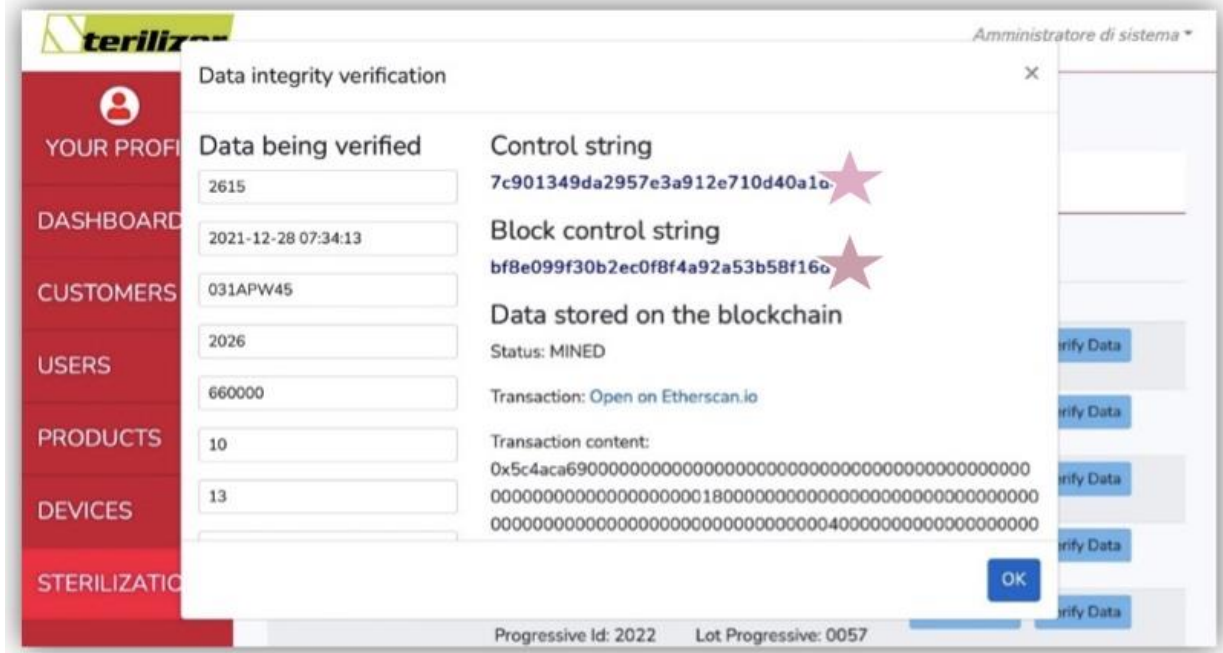
**BLOCKCHAIN**



# Blockchain Virus-Free Personalized Vitrification

P-777: Parmegiani et al – ESHRE Meeting – Milan Italy 3-6 July 2022

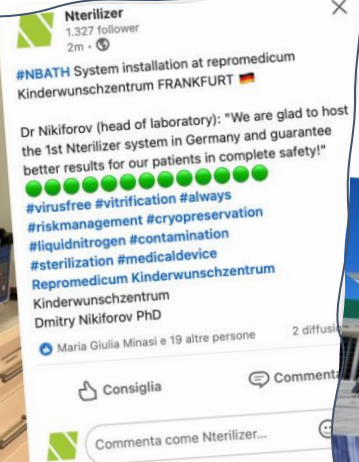
This is the first evidence of the application of Blockchain in IVF and many others will probably follow. Blockchain immutable records of LN2 sterilization combined with procedure codes and disposable lots represent incorruptible traces for “Virus-Free” vitrification/warming. During this pandemic **219** babies were born from cryopreservation procedures powered by Blockchain



# Vitrificazione Personalizzata Virus-Free Blockchain

Ad oggi, dall'inizio della pandemia presso il nostro centro Next Fertility GynePro sono già nati **363** bambini da cellule congelate con tecnologia Blockchain Virus-Free

La tecnologia si sta diffondendo in tutto il mondo!



**Sanità**

## All'ospedale di Lagosanto la conservazione degli embrioni è "virus-free"



Il Delta è il primo centro pubblico in Italia a usare la nuova tecnica che sterilizza l'azoto impiegato nella procreazione assistita



**Flessibilità:**  
**Universal Warming**  
**il Protocollo**  
**Universale di**  
**Scongelamento**



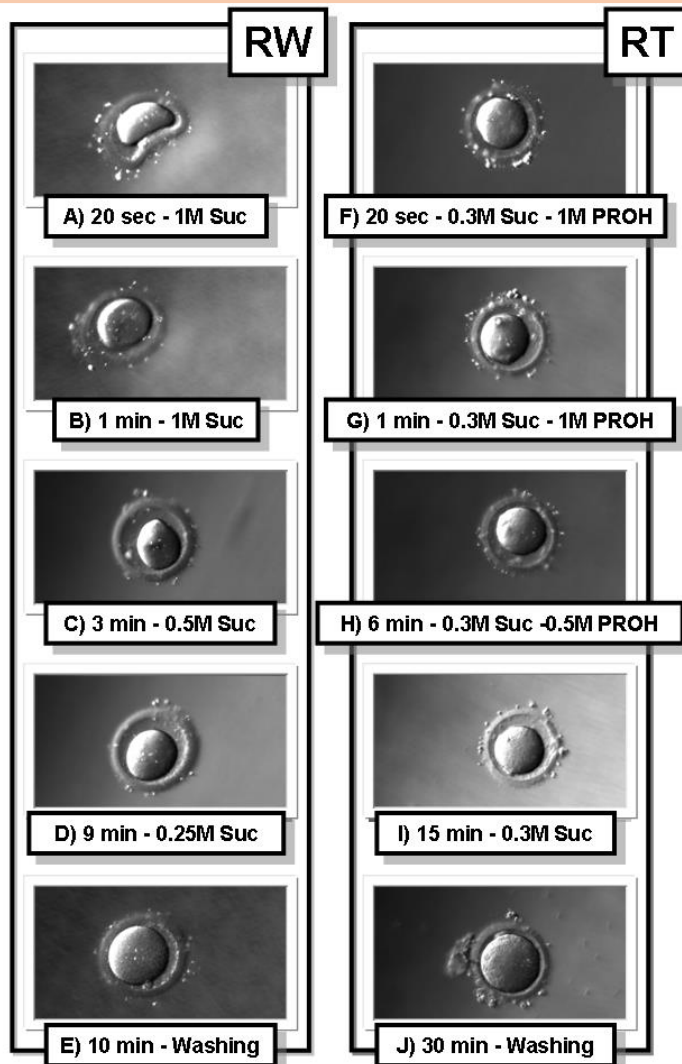
**Next Fertility**  
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# Background



- Le cellule crioconservate vengono trasportate tra centri PMA autorizzati per svariate ragioni
  - volontà dei pazienti, regolamenti, traslochi, guerra...
- Gli ovociti e gli embrioni vengono vitrificati utilizzando diverse marche di kit pronti all'uso
- Le aziende produttrici potrebbero cambiare composizione o ritirare alcuni kit
- Alcuni kit potrebbero non essere più disponibili
  - perdita marcatura CE, problemi nella distribuzione
- **Un protocollo di "riscaldamento universale" può facilitare lo scambio di cellule/tessuti riproduttivi vitrificati tra i centri PMA**

# Studio “Proof of Concept” - 2014



## Eseguito su ovociti, le cellule riproduttive più fragili

Protocollo di VIT-warming applicato su ovociti “slow frozen”

- utilizzando solo crioprotettori extracellulari (ECCPs)
- first warming step: **1 M**
- second warming step: **0.5 M**

Risultati

- sopravvivenza e sviluppo paragonabile

Conclusione

- procedura per riscaldare qualsiasi cellula/tessuto riproduttivo
- indipendentemente dai protocolli di congelamento
- *Parmegiani et al, RBMO 2014;28:614-23*

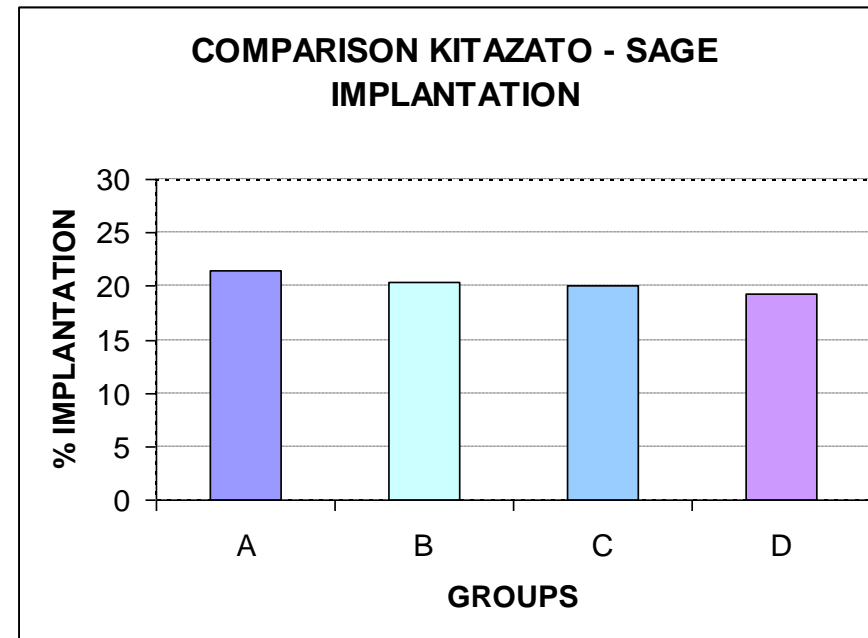
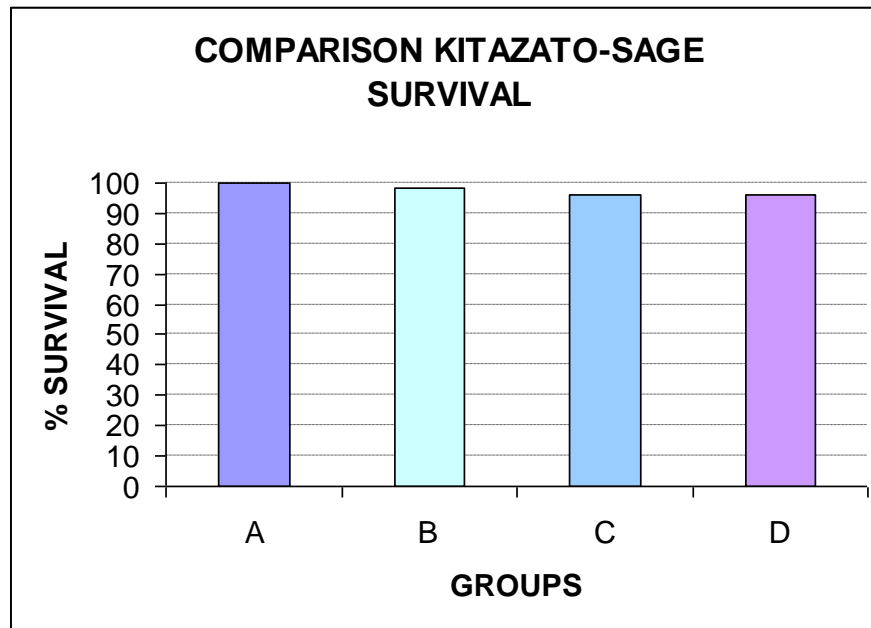
# Universal Warming - Protocollo

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- Medium
  - any basic medium: TC199, HTF-MOPS, PBS, HAMS, etc.
  - any ECCP: Trehalose – Sucrose
  - any supplement: Hydroxypropyl Cellulose, Dextran Serum Supplement , Albumin, etc.
- 1 minute 4 mL 1M ECCP 37°C
- 3 minutes 300 µL 0.5 ECCP Room Temperature (RT)
- 5 minutes 300 µL washing solution RT
- 1 minute 300 µL washing solution RT
- 1-2 hours incubation prior to ICSI (oocytes) or ET (embryos)

# Primo studio clinico su combinazione di diversi VIT/WARM kits - Blastocisti - 2017

**A**(Kitazato/Kitazato) **B**(Kitazato/Sage) **C**(Sage/Kitazato) **D**(Sage/Sage)

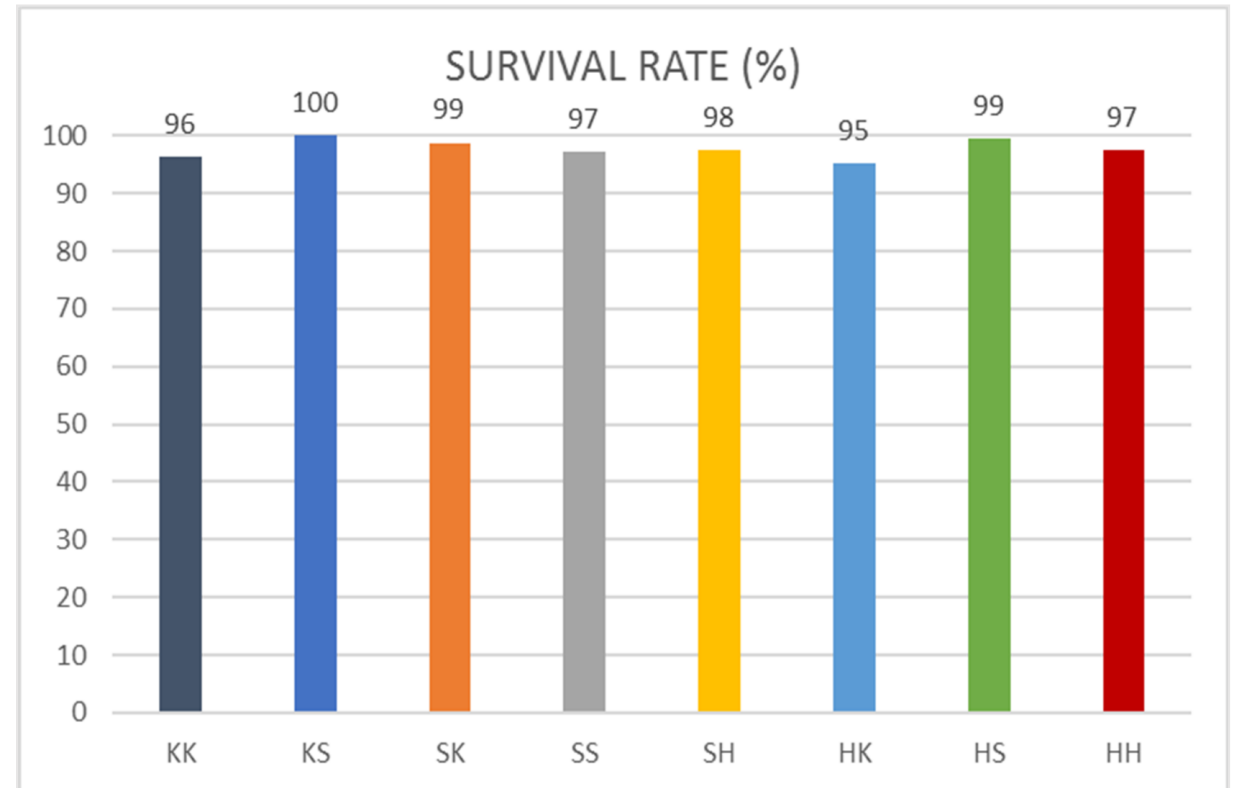


- Tassi di sopravvivenza e impianto statisticamente comparabili
  - *Parmegiani et al, Fertil Steril 2017; 108:e173*

# Primo studio clinico su combinazione di diversi VIT/WARM kits – Embrioni DAY3 -2018

1055 vitrified cleavage-stage embryos - Cohort Study

KK – vitrification Kitazato/warming Kitazato  
KS – vitrification Kitazato/warming Sage  
SK – vitrification Sage/warming Kitazato  
SS – vitrification Sage/warming Sage  
SH – vitrification Sage/warming “in house kit”  
HK – vitrification “in house kit”/warming Kitazato  
HS - vitrification “in house kit”/warming “Sage”  
HH –vitrification “in house kit”/warming “in house kit”

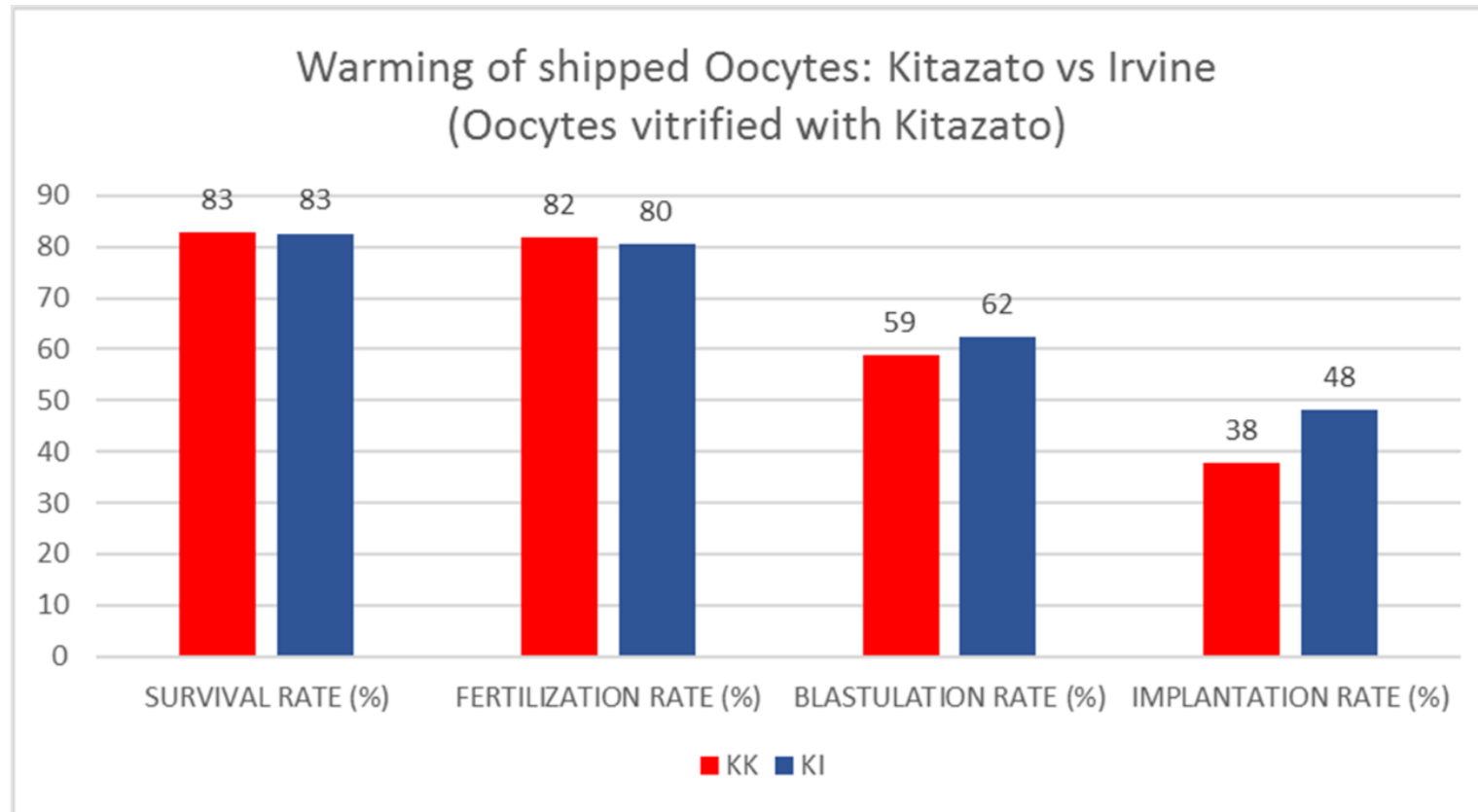


- Tasso di sopravvivenza statisticamente comparabile
  - *Parmegiani et al, Fertil Steril 2018;110:e230*
  - *JARG 2018;35:1887-1895*



# Primo studio clinico su Ovociti donati - 2018

820 vitrified oocytes **KK (Kitazato/Kitazato) 233** - **KI (Kitazato/Irvine) 587**



- Sopravvivenza, fertilizzazione, blastulazione e impianto paragonabile
- Parmegiani et al, Fertil Steril 2018;110:e230

# Studio multicentrico – Ovociti donati 2019

Studio multicentrico retrospettivo su 238 pazienti

- ovociti donati vitrificati in Spagna
  - Vitrification Kit (Kitazato)
  - 1898 ovociti scongelati e inseminati in 2 centri in Italia
    - 238 transfer di blastocisti
  - Ovociti assegnati a 2 gruppi per lo scongelamento
    - KK (Kitazato/Kitazato) 939
    - KI (Kitazato/Irvine) 959
  - Coltura Time Lapse Embryoscope (Vitrolife)

Risultati

- sopravvivenza, blastulazione, impianto e tassi di nati vivi tutti comparabili
  - *Parmegiani et al, JARG 2020;37:1379-1385*



# The “coming-out” of “off-label” use of warming kit brands

Are commercial warming kits interchangeable for vitrified human blastocysts? Further evidence for the adoption of a Universal Warming protocol

Stefano Canosa<sup>1</sup> · Lodovico Parmegiani<sup>2</sup> · Lorena Charrier<sup>3</sup> · Gianluca Gennarelli<sup>1</sup> · Cristina Garello<sup>1</sup> · Francesca Granella<sup>1</sup> · Francesca Evangelista<sup>1</sup> · Giuseppe Monelli<sup>1</sup> · Daniela Guidetti<sup>1</sup> · Alberto Revelli<sup>1</sup>

Glad to see that the Universal Warming Protocol (Parmegiani 2014, 2018, 2020) is becoming more and more universally applied! 🌸 ⌚ Time is a gentle deity!!! 🌸

Yolanda Cabello goooooo!

Yolanda Cabello · 1°  
1 ora · 🌐

Nice days in Amsterdam presenting the Communication “Validation of ‘universal warming’ comparing four different vitrification kits thawed with a single commercial warming kit” at #cogi2022 and enjoying friends #sharingscience



Glad to see that the Universal Warming Protocol (Parmegiani 2014, 2018, 2020) is becoming more and more universally applied! 🌸 ⌚ Time is a gentle deity!!! 🌸

#parmegiani #universal #warming #vitrification #oocytes #embryos  
#references #combination #kits

Eveline Depoorter · 1°  
1 giorno · 🌐

Taller de Vitrificación en Panama @Redlara Panama, viernes Nov 25!  
Bienvenido! #Coopersurgical #RedlaraPanama

Vedi traduzione

CooperSurgical<sup>®</sup>  
Fertility Solutions

Únase a nosotros en nuestro próximo taller de vitrificación

Taller REDLARA PANAMA Noviembre 25, 2022  
Libertad en la Clínica: El Protocolo Universal de Warming

*This result supports the “off-label” use of different combinations of vitrification and warming kits, allowing practitioners worldwide to “come-out” of the closet!*

*Questo risultato supporta l'uso "off-label" di diverse combinazioni di kit di vitrificazione e warming, consentendo agli operatori di tutto il mondo di "uscire allo scoperto"!*



# **Sicurezza e Flessibilità: Business Continuity Disaster Plan Relocation**



**Next Fertility**  
GynePro

# Rischi associati alla criopreservazione

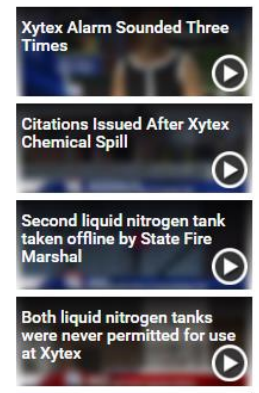
Risks of Cryopreservation

## Risks associated with cryopreservation: a survey of assisted conception units in the UK and Ireland

Mathew Tomlinson & David Morroll

Pages 33-42 | Published online: 03 Jul 2009

### UPDATE | Tanks did not cause chemical leak at Xytex, investigators say



By Staff | Posted: Mon 1:07 PM, Feb 13, 2017 | Updated: Mon 1:13 PM, Feb 13, 2017



Monday, Feb. 13, 2017

AUGUSTA, Ga. (WRDW/WAGT) – New details are being released about the liquid nitrogen leak at the Xytex Corporation last week.

Investigators say the tanks did not cause the chemical leak, they believe there was a malfunction with the system. The tanks supply nitrogen to the system, but the State Fire Marshal does not regulate the system.

Investigators say the alarm at Xytex went off a total of three times the day of the accident, 1:43pm, 3:26pm, and 3:44pm. Xytex reported the alarm went off at 3:26pm in their news release.

The state fire marshal cited Xytex and Airgas on Tuesday last week for violations involving the liquid nitrogen tank that caused the deadly leak. Deputy State Fire Marshal Chris Stephen returned to Xytex the next day with another citation for a second tank.

The leak killed Richmond County Sgt. Greg Meagher, and put three additional deputies and Anita Wylds, a Xytex worker, in the hospital.

Xytex is still prohibited from using the tanks. Fire Marshal's office and OSHA are still investigating the incident.



Xytex Leak - 2.5.17 /Augusta, GA.

News

## UH freezer malfunction update: More than 150 families settle lawsuits in loss of embryos

Updated: Sep. 29, 2019, 10:09 a.m. | Published: Sep. 29, 2019, 5:00 a.m.

## Jury awards \$15 million in landmark case over embryos, eggs destroyed in fertility clinic tank failure

By Derek Hawkins

June 11, 2021 at 7:25 p.m. EDT



## These would-be parents' embryos were lost. Now they're grieving — and suing.

By Ariana Eunjung Cha  
August 24, 2018 at 7:39 p.m. EDT



# Marzo 2018 USA: uno spartiacque per i laboratori PMA

*Mina Alikani 2022*



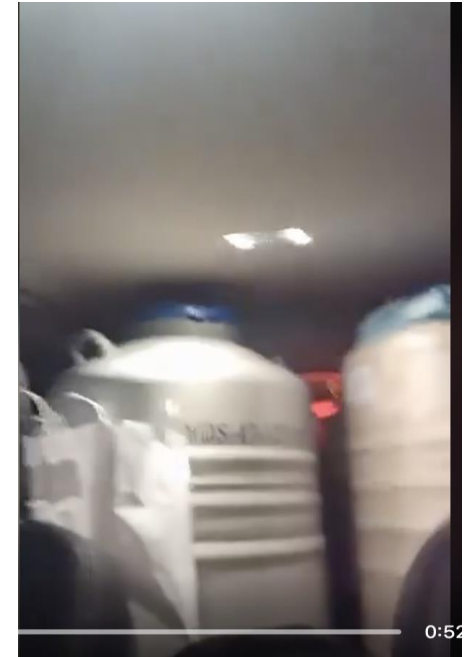
**Birol Aydin** · 1°

Lab Director and Scientific Director at OVOGENE EGG BANK

9m · 🌐

Frozen embryos and oocytes relocated from Ukraine to EU! Thank you very much Uliana Dorofeyeva and ARK.CRYO and IVMED team for all support and help.

You can destroy the buildings but you will never succeed the destroy our hopes and dreams! #Ukraine #gloryukraine



# 2022 - Trasloco per guerra

*Birol Aydin 2022*

## Human Reproductive Cell Cryopreservation, Storage, Handling, and Transport: Risks and Risk Management

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Semin Reprod Med 2018;36:265–272

## Cryostorage of reproductive tissues in the in vitro fertilization laboratory: a committee opinion

Practice Committees of the American Society for Reproductive Medicine, Society for Reproductive Biologists and Technologists, and Society for Assisted Reproductive Technology

American Society for Reproductive Medicine, Birmingham, Alabama

- controllare i serbatoi tre volte alla settimana
- monitoraggio continuo tramite sonda di livello/temperatura
- allarmi continui testati periodicamente
- scorte sufficienti di LN<sub>2</sub> per le emergenze
- adeguata protezione personale
  - guanti, scudo, occhiali e schermatura della pelle
- immagazzinare i serbatoi in un'area di stoccaggio ben ventilata
- adeguata formazione del personale
- schede di sicurezza e segnaletica



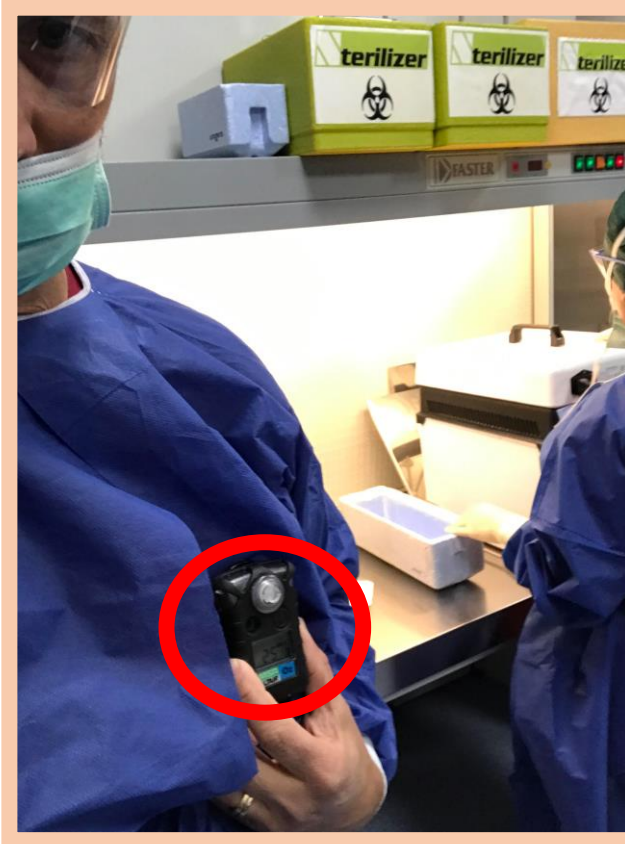
Management of Risk

- Emergency Plan
- Inevitability

MA 2022



# Sicurezza per gli operatori



# Sicurezza per le cellule – Disaster Recovery



# Conclusioni Finali – il laboratorio PMA del Futuro

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- Sicurezza
  - Automatic Witness System
  - Vittrificazione Personalizzata Virus-Free Blockchain
- Flessibilità
  - Universal Warming
- Sicurezza e Flessibilità
  - Business Continuity
    - Disaster Plan / Relocation