VITRIFICATION OF OOCYTES & EMBRYOS

Maximize success with a versatile cryopreservation system
VITRIFICATION

RETRIEVE AND RINSE OOCYTES

PREINCUBATE

Hyaluronidase

DENUDE (ICSI)

Multipurpose Handling Medium

ICSI

Continuous Single Culture medium

VITRIFICATION

TRANSFER BLASTOCYST

Multipurpose Handling Medium

UNINTERRUPTED CULTURE

Day 1

Day 3

Day 5

HELP AT EVERY STEP

with simpler processes, less stress and better results

Vit Kit®-Freeze
Vit Kit®-Thaw
LEADING THE WAY
to greater workflow efficiency and increased pregnancy rates

Irvine Scientific has been a well-recognized supplier of innovative media solutions and lab supplies to the A.R.T. community for almost 30 years.

Media solutions, such as ISolate® for sperm preparation and Freezing Medium TYB for cryopreservation, have set industry standards in the field of andrology. Irvine Scientific pioneered the use of vitrification to increase survival rates of cryopreserved oocytes and embryos with Vit Kit-Freeze and Vit Kit-Thaw. Today, with a new generation of optimized, multi-use media, Multipurpose Handling Medium® and Continuous Single Culture®, Irvine Scientific continues to increase workflow efficiency and contribute to successful pregnancies in clinics throughout the world.

VITRIFICATION OF OOCYTES AND EMBRYOS

- Versatile system – expand therapeutic strategies, maximize conception potential
- Complete solution – compatible with any device

Learn about the latest Irvine Scientific solutions for reproductive technologies in our brochures:
- From gametes to blastocysts
- Vitrification of oocytes and embryos
- Sperm preparation, handling and storage

Visit www.irvinesci.com
Maximize use of embryos from a single cycle
Optimize outcomes from elective single embryo transfer

ACHIEVE HIGH SURVIVAL AND PREGNANCY RATES

<table>
<thead>
<tr>
<th>OOCYTES</th>
<th>SURVIVAL RATE</th>
<th>PREGNANCY RATE</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>n = 123**</td>
<td>90.2%</td>
<td>50% clinical 45% ongoing</td>
<td>1</td>
</tr>
<tr>
<td>n = 48</td>
<td>89%</td>
<td>50% clinical</td>
<td>2</td>
</tr>
<tr>
<td>n = 325**</td>
<td>89.6%</td>
<td>-</td>
<td>3</td>
</tr>
</tbody>
</table>

Independent clinical data – see page 10 for references. Vitrification device: ** HSV Straw.

MAXIMIZE SURVIVAL RATES AND HELP ENSURE SUCCESSFUL PREGNANCIES

<table>
<thead>
<tr>
<th>EMBRYOS</th>
<th>SURVIVAL RATE</th>
<th>PREGNANCY RATE</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blastocysts</td>
<td>87.5%</td>
<td>56.3% clinical 47.6% ongoing</td>
<td>4</td>
</tr>
<tr>
<td>Biopsied, re-vitrified blastocysts n = 24</td>
<td>98.3%</td>
<td>61.2% clinical 54% ongoing</td>
<td></td>
</tr>
<tr>
<td>Artificially collapsed blastocysts* n = 266</td>
<td>99.6%</td>
<td>53% clinical 72.2% overall</td>
<td>5</td>
</tr>
<tr>
<td>Embryos** n = 1239 Day 2 n = 590 Day 3 n = 356 Day 5</td>
<td>92.1% Day 2 95.6%, Day 3 90.4% Day 5</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>Artificially collapsed blastocysts** n=65</td>
<td>98.7%</td>
<td>57.5% clinical 51.7% ongoing</td>
<td>7</td>
</tr>
<tr>
<td>Biopsied, re-vitrified blastocysts*** n = 15</td>
<td>100%</td>
<td>62% clinical</td>
<td>8</td>
</tr>
</tbody>
</table>

Independent clinical data – see page 10 for references. Vitrification devices: *Cryolock, **HSV Straw, ***CryoTip

As vitrification continues to play an integral role in the success of our laboratory and ultimately our patients, I can rely on these kits to provide the consistency and results that I, and our patients, expect.

Matthew VerMilyea PhD, HCLD/CC (ABB), Texas Fertility Center, U.S.A.
VERSATILE SYSTEM

Expand therapeutic strategies – maximize conception potential

Simplify your processes

- One kit for oocytes and all stages of embryos
- Ready-to-use
- Compatible with any vitrification device
- Shelf life 8 weeks after opening

FOLLOW SIMPLE, VERIFIED PROTOCOLS USING OPTIMIZED SOLUTIONS

<table>
<thead>
<tr>
<th>VitKit SOLUTIONS</th>
<th>DMSO (V/V)</th>
<th>ETHYLENE GLYCOL (V/V)</th>
<th>SUCROSE</th>
<th>BASAL MEDIUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equilibration Solution (ES)</td>
<td>7%</td>
<td>7.5%</td>
<td>0</td>
<td>Modified M199, including 21 mM HEPES, 20% DSS (HSA and dextran, containing 10 mg/mL protein, 35 µg/mL gentamicin)</td>
</tr>
<tr>
<td>Vitrification Solution (VS)</td>
<td>15%</td>
<td>15%</td>
<td>0.5M</td>
<td></td>
</tr>
<tr>
<td>Thawing Solution (TS)</td>
<td>0%</td>
<td>0%</td>
<td>1.0M</td>
<td></td>
</tr>
<tr>
<td>Dilution Solution (DS)</td>
<td>0%</td>
<td>0%</td>
<td>0.5M</td>
<td></td>
</tr>
<tr>
<td>Washing Solution (WS)</td>
<td>0%</td>
<td>0%</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

“I have been using Vit Kit -Freeze and Vit Kit -Thaw since 2010. My average oocyte and blastocyst survival rates have been in the range 93-100% and my average clinical pregnancy rates have been well over 50%. With the amount of trophectoderm biopsy and pre-implantation genetic screening my laboratory does, it is imperative that our vitrification program performs consistently well, guaranteeing nearly 100% survivability of warmed euploid embryos.”

Matthew VerMilyea, PhD, HCLD/CC (ABB),
Director, Ovation Fertility Austin Embryology and Andrology Laboratories;
Director, San Antonio IVF Embryology and Andrology Laboratories
Scientific Director, Texas Fertility Centers

Vitrified/warmed human blastocysts.
Photo courtesy of Juergen Liebermann, PhD, HCLD, Fertility Centers of Illinois, Illinois, USA
"I have used Irvine Scientific kits for oocytes, embryos and blastocysts since 2011, with very successful survival rates and ongoing pregnancy rates. Our program uses closed vitrification systems, the kits work very efficiently under these conditions. I advise my peers in France and beyond to use these products."

Professor Samir HAMAMAH, Medical head of ART/PGD Department, Hôpital Arnaud de Villeneuve, Montpellier, France
**COMPLETE SOLUTION**

The complete vitrification solution compatible with any device

**Efficient, secure closed or semi-closed system**

Cryolock™ vitrification devices, manufactured by Biotech Inc. (an ISO 13485:2003 registered Medical Device Manufacture Company) are for holding, cryopreservation and storage of oocytes or embryos in liquid nitrogen.

- **No extra equipment or accessories required**
- **Fully compatible with Vit Kit -Freeze and Vit Kit -Thaw**
- **Maximized specimen safety - secure, hermetic seal keeps tip isolated from liquid nitrogen**
- **FDA 510(k) Cleared, CE-marked and Health Canada Approved**

**HIGH SURVIVAL AND PREGNANCY RATES**

<table>
<thead>
<tr>
<th>HIGH SURVIVAL AND PREGNANCY RATES</th>
<th>WITH ASSISTED HATCHING</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Survival Rate</strong></td>
<td><strong>Clinical Pregnancy Rate</strong></td>
<td><strong>Reference</strong></td>
</tr>
<tr>
<td>89% (oocyte) n = 325</td>
<td>50%</td>
<td>2</td>
</tr>
<tr>
<td>98% (blastocyst) n = 116</td>
<td>61%</td>
<td>4</td>
</tr>
</tbody>
</table>

Independent clinical data – see page 10 for references.

**Secure closed system**

HSV Straws, manufactured by Cryobio system, offer a secure, closed system for cryopreservation and storage of oocytes, embryos or blastocysts in liquid nitrogen.

- **Requires SYMS III™ sealer and opening device**
- **Fully compatible with Vit Kit -Freeze and Vit Kit -Thaw**
- **CE-marked, FDA 510(k) Cleared**

**HIGH SURVIVAL AND PREGNANCY RATES**

<table>
<thead>
<tr>
<th>Transfer</th>
<th>Blastocyst survival</th>
<th>Positive pregnancy*</th>
<th>Clinical pregnancy*</th>
<th>Ongoing/delivered pregnancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>441</td>
<td>99.5%</td>
<td>71.2%</td>
<td>61.5%</td>
<td>54.2%</td>
</tr>
<tr>
<td>271</td>
<td>99.6%</td>
<td>62.7%</td>
<td>50.9%</td>
<td>42.1%</td>
</tr>
</tbody>
</table>

**Clinical pregnancy**

Day 5 99.5% 61.5% 54.2% 99% 61% 59%

Day 6 99.6% 50.9% 42.1% 99% 62% 50%

Blastocysts survived 99.5% 99.6%

Positive pregnancy* 71.2% 62.7%

Clinical pregnancy* 61.5% 50.9%

Ongoing/delivered pregnancies 54.2% 42.1%

Pre-sealed weighted end and flared opening

Gaps at extremes for easy gripping with forceps during manipulation

Ample surface for labeling for clear identification

Exclusive cap design ensures a secure, hermetic seal

Concave tip protects oocytes or embryos from contact with other surfaces to avoid loss or damage.

High Security, ultra-thin straw with pre-sealed weighted end and flared opening

Capillary tube with pre-formed gutter and colored handling rod

Plastic insertion device

Body and cap made from same material facilitate even conduction and secure coupling at room and freezing temperatures

Secure closed system

Body and cap made from same material facilitate even conduction and secure coupling at room and freezing temperatures

Secure closed system

Independently developed and manufactured.

High Security, ultra-thin straw with pre-sealed weighted end and flared opening

Capillary tube with pre-formed gutter and colored handling rod

Plastic insertion device

Ample surface for labeling for clear identification

Exclusive cap design ensures a secure, hermetic seal

Concave tip protects oocytes or embryos from contact with other surfaces to avoid loss or damage.

High Security, ultra-thin straw with pre-sealed weighted end and flared opening

Capillary tube with pre-formed gutter and colored handling rod

Plastic insertion device

Ample surface for labeling for clear identification

Exclusive cap design ensures a secure, hermetic seal

Concave tip protects oocytes or embryos from contact with other surfaces to avoid loss or damage.
We perform about 2,000 cycles per year. Most are freeze-all cycles. Sometimes we vitrify as many as 100 blastocysts and oocytes per day. We appreciate how easy it is to use Irvine Scientific’s kits and we have seen excellent success rates with a variety of vitrification devices.”

Dr. Wei-Hua Wang, IVF Laboratory Director, Vivere Houston Fertility Laboratory, Texas, U.S.A.

<table>
<thead>
<tr>
<th>CLINICAL PREGNANCY RATE</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh blastocysts n=44*</td>
<td>56.8%</td>
</tr>
<tr>
<td>Frozen blastocysts n=44*</td>
<td>63.6%</td>
</tr>
<tr>
<td>Fresh blastocysts n=36**</td>
<td>63.9%</td>
</tr>
<tr>
<td>Frozen blastocysts n=37**</td>
<td>67.6%</td>
</tr>
</tbody>
</table>

Independent clinical data – see page 10 for references.
Vitrification devices: *HSV Straw, **CryoTip
Since Irvine Scientific pioneered its use, vitrification has become the standard for cryopreservation in fertility clinics around the world, proven to increase survival and pregnancy rates when compared to slow freezing.

Vitrification kits from Irvine Scientific use permeating (DMSO and ethylene glycol) and non-permeating (sucrose) cryoprotectants to dehydrate oocytes and embryos before they are plunged into liquid nitrogen. This prevents the formation of ice crystals associated with slow freezing which can be lethal to cells.

**IMPROVED OUTCOMES COMPARED TO SLOW-FREEZING**

![Graph comparing slow freezing and vitrification outcomes]

Prospective randomized comparison of human oocytes cryopreservation with slow-rate freezing or vitrification, Smith et al., Fertility and Sterility, 2010 Nov;94(6):2088-95

**An optimal combination to ensure success**

In Vit Kit -Freeze and Vit Kit -Thaw the hazards associated with the use of cryoprotectants are minimized by using them in combination at reduced concentrations within freeze/thaw protocols to minimize exposure times and enable rapid freezing. Cryolock and HSV Straws provide a choice of semi-closed or closed storage devices that ensure a rapid, even rate of heat transfer to enhance the freezing process and prevent ice-crystal formation.

**Oocyte being warmed post-vitrification**

Re-entry of water is controlled during warming to allow the oocyte to return to its normal size at conclusion of the process. Photo courtesy of Joe Conaghan, PhD, HCLD, Pacific Fertility Center, San Francisco, California, USA
**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CATALOG #</th>
<th>SIZE</th>
<th>ADDITIONAL INFORMATION</th>
<th>SHELF LIFE</th>
<th>STORAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vit Kit -Freeze</td>
<td>90133-SO</td>
<td>ES, 2 x 1mL VS, 2 x 1mL</td>
<td>For use with oocytes (MII), pronuclear (PN) zygotes through day 3 cleavage stage embryos and blastocyst stage embryos.</td>
<td>1 year* 8 weeks after opening</td>
<td>2–8°C</td>
</tr>
<tr>
<td>Vit Kit -Thaw</td>
<td>90137-SO</td>
<td>TS, 4 x 2mL DS, 1 x 2mL WS, 1 x 2mL</td>
<td>For use with oocytes (MII), pronuclear (PN) zygotes through day 3 cleavage stage embryos and blastocyst stage embryos.</td>
<td>1 year* 8 weeks after opening</td>
<td>2–8°C</td>
</tr>
</tbody>
</table>

*From date of manufacture

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CATALOG #</th>
<th>SIZE</th>
<th>ADDITIONAL INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSV High Security Vitrification Straw (Red)</td>
<td>25246</td>
<td>4 straws/pack</td>
<td>Supplied sterile in peel-off blister pack. Requires SYMS III sealer and opening device</td>
</tr>
<tr>
<td>HSV High Security Vitrification Straw (White)</td>
<td>25247</td>
<td>4 straws/pack</td>
<td></td>
</tr>
<tr>
<td>HSV High Security Vitrification Straw (Yellow)</td>
<td>25248</td>
<td>4 straws/pack</td>
<td></td>
</tr>
<tr>
<td>HSV High Security Vitrification Straw (Mauve/Pink)</td>
<td>25249</td>
<td>4 straws/pack</td>
<td></td>
</tr>
<tr>
<td>HSV High Security Vitrification Straw (Blue)</td>
<td>25250</td>
<td>4 straws/pack</td>
<td></td>
</tr>
<tr>
<td>HSV High Security Vitrification Straw (Green)</td>
<td>25251</td>
<td>4 straws/pack</td>
<td></td>
</tr>
<tr>
<td>SYMS III Sealer</td>
<td>25547</td>
<td>1 unit</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CATALOG #</th>
<th>SIZE</th>
<th>ADDITIONAL INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryolock (Blue)</td>
<td>CL-R-CT-B</td>
<td>50 devices/pack</td>
<td>Sterile, sealed vials</td>
</tr>
<tr>
<td>Cryolock (Green)</td>
<td>CL-R-CT-G</td>
<td>50 devices/pack</td>
<td>Sterile, sealed vials</td>
</tr>
<tr>
<td>Cryolock (Clear)</td>
<td>CL-R-CT-C</td>
<td>50 devices/pack</td>
<td>Sterile, sealed vials</td>
</tr>
<tr>
<td>Cryolock (Orange)</td>
<td>CL-R-CT-O</td>
<td>50 devices/pack</td>
<td>Sterile, sealed vials. Not available in USA</td>
</tr>
<tr>
<td>Cryolock (Yellow)</td>
<td>CL-R-CT-Y</td>
<td>50 devices/pack</td>
<td>Sterile, sealed vials. Not available in USA</td>
</tr>
<tr>
<td>CryoTip</td>
<td>40709</td>
<td>5 devices/pack</td>
<td>Sterile, in peel-off blister pack</td>
</tr>
</tbody>
</table>

**References**

Irvine Scientific was the first ART manufacturing company in the USA to receive ISO 13485:2003 quality system certification, the rigorous international quality assurance standard designed specifically for Medical Devices.

Products are manufactured in accordance with the Guidelines for Manufacture of Medical Device and In Vitro Diagnostic Products and the Good Manufacturing Practices (GMPs) for Medical Devices.

Every Irvine Scientific product is subject to a stringent Quality System, unrivalled in the industry, and produced in well-established, cGMP compliant facilities.

Formulations use WFI Grade Water and chemicals that meet USP and ACS standards where available. All products are membrane-filtered and aseptically processed according to manufacturing procedures which have been validated to meet a sterility assurance level of $10^{-3}$. Every batch of medium is thoroughly tested for functionality, endotoxin level, pH, osmolality and sterility. Results are provided in lot-specific Certificates of Analysis.

With the exception of certain ancillary products, all products in this brochure are CE marked and FDA cleared. Quality and regulatory management systems ensure compliance with the broadest scope of regulatory requirements, including ISO 13485:2012, FDA’s QSR, European Medical Devices Directive (93/42/EEC).

Vit Kit-Freeze and Vit Kit-Thaw are intended for use with oocytes (MII), pronuclear (PN) zygotes through day 3 cleavage stage embryos and blastocyst stage embryos.
Irvine Scientific develops and supplies products and services wherever our expertise in the growth and handling of mammalian cells can contribute to the health and well-being of mankind – today and in the future.

Irvine Scientific is a wholly owned subsidiary of the JX Group. Managed by JX Holdings, Inc., a Fortune 500 company, the JX Group mission is to contribute to the development of a sustainable economy and society through innovation in the areas of energy, resources and materials.