



Summary of the ISFP congress, New York, 14–16 November, 2019

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On November 14–16, 2019, the 6th World Congress of the International Society for Fertility Preservation (ISFP) took place in New York at the New York Hilton Midtown, bringing together hundreds of participants, including internationally renowned leaders in the field of fertility preservation. These experts presented important updates on their research, giving way to thought-provoking debates in this rapidly evolving and promising field of reproductive medicine.

In addition to 11 keynote sessions, 13 selected oral communications out of 166 submitted abstracts were presented over 2 sessions, one on basic science and the other on clinical research. Two poster sessions were also held on Friday and Saturday, exhibiting 130 posters in total, relating to both basic science and clinical research.

Thursday morning was devoted to pre-congress courses, the first focusing on cryopreservation of ovarian tissue, where Claus Yding Andersen (Denmark) and Jacques Donnez (Belgium) outlined the indications for ovarian tissue collection and different techniques of ovarian tissue retrieval and transplantation. Participants also had the opportunity to attend practical sessions to learn how to prepare ovarian tissue for slow freezing using bovine ovaries, under the supervision of three esteemed specialists in the field, Marie-Madeleine Dolmans (Belgium), Debra Gook (Australia), and Stine Gry Kristensen (Denmark).

The second pre-congress course tackled a topic of increasing interest, namely, fertility in transgender patients, organized by Pasquale Patrizio (USA), Cecilie Ferrando (USA), and

Gwendolyn Quinn (USA). Endocrine treatments and fertility preservation options available to this particular population were debated.

On Thursday afternoon, participants received a warm welcome and general introduction from the President, Tommaso Falcone, and the American organizers, followed by the first session of this congress, which centered on *in vitro* gametogenesis and bioengineering of reproductive tissue. Christiani Amorim (Belgium) opened the speeches, describing the challenges of developing an engineered artificial ovary and recent advances made in this area. Stine Gry Kristensen (Denmark) concentrated more specifically on modeling of the human decellularized extracellular matrix and the difficulties of isolated preantral follicles inside this matrix, while maintaining a satisfactory follicle recovery rate. After these exciting lectures, David Albertini (USA) presented the latest updates on human *in vitro* folliculogenesis, stressing the fact that if the germinal vesicle is not anchored to the oocyte membrane, it will not be able to resume meiosis. The last lecture of this session was devoted to testicular tissue engineering, with Ellen Goossens (Belgium) presenting the latest updates on the development of artificial testis.

The second session of this prestigious event was very intriguing and offered new insights into future perspectives for fertility preservation. Katsuhiko Hayashi (Japan) and Sherman Silber (USA) explained how their teams managed to obtain pluripotent stem cells from skin biopsies in mice and humans. Katsuhiko Hayashi then described how these induced pluripotent stem cells were able to restore oogenesis, yielding healthy offspring in mice. He also addressed the main factors involved in oocyte dormancy, namely, oxygen levels, pressure, and the extracellular matrix.

Antonio Pellicer (Spain) gave us compelling information on how to boost the reproductive potential of patients with a low ovarian reserve by injecting autologous bone marrow stem cells through their ovarian artery. Pedro Barri (Spain) reviewed fertility preservation options for non-medical indications, emphasizing the lack of awareness among women about the link between aging and the drop in reproductive potential and highlighting the superior fertility outcomes

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obtained if preservation is done before the age of 36. Before the welcome reception, Pasquale Patrizio (USA) invited a patient, Roberta Lombardi, founder of Infinite Strength, to talk about how she coped with the news and subsequent treatment of her breast cancer, in order to give medical doctors some pointers on how to better manage these patients.

The second day of the congress was intense, with a number of engaging lectures by worldwide experts in the field. The first session of the morning, chaired by Glenn Schattman (USA) and Samuel Kim (USA), focused on breast cancer. All key points concerning the treatment and counseling of young patients were addressed: effects of cancer treatment on future fertility by Clarissa Gracia (USA), current chemotherapy treatments and protocols by Michael Di Giovanna (USA) and Halle Moore (USA), fertility preservation options with a particular emphasis on patients with genetic mutations by Glenn Schattman (USA), and infertility treatments and IVF outcomes by Mitchell Rosen (USA) and Stine Gry Kristensen (Denmark). Reports of improved IVF outcomes after ovarian tissue transplantation by Stine Gry Kristensen (Denmark) sparked great interest from the audience, as an updated review of the literature on stimulation protocols and their effectiveness was presented.

The second part of the morning saw two sessions, one on fertility preservation options in benign gynecological conditions and the other focused on oocyte culture and freezing. In the first session, two main benign conditions were considered: endometriosis and fibroids. Tommaso Falcone (USA) and Jacques Donnez (Belgium) detailed the best surgical management for endometriomas and indications for fertility preservation, while Hugh Taylor (USA) explained the medical approach to treating endometriosis. Regarding fibroids, Antonio Gargiulo (USA) and Elizabeth Steward (USA) talked about fertility-sparing surgery and therapeutic options for young patients with fibroids, highlighting differences in clinical management in the absence of medical treatment with ulipristal acetate, as is done in the USA.

The parallel session focused on oocyte cryopreservation indications and techniques by Amir Arav (Israel) and Peter Nagy (USA), medical elective oocyte freezing by Pasquale Patrizio (USA), and oocyte culture and in vitro maturation by Claus Yding Andersen (Denmark).

The afternoon was also structured around two parallel sessions. In the first, which centered on male fertility restoration options and research updates, we had the pleasure to listen to Peter Schlegel (USA) describing the effects of cancer treatment on male fertility, after which James Smith (USA) presented fertility preservation approaches in men with testicular cancer. Herman Tournaye (Belgium) then outlined the perspectives for fertility restoration in prepubertal boys. The last lecture of this session concerned stem cell therapy for male infertility, nicely explained by Kyle Orwig (USA).

The parallel session was devoted to ovarian tissue cryopreservation, addressing several key points concerning the state of the art of this medical approach. Debra Gook (Australia) and Stine Gry Kristensen (Denmark), respectively, stressed the need for good practice in ovarian tissue cryopreservation and transplantation, while other speakers reported the latest research findings, with a view to enhancing ovarian tissue transplantation outcomes. Marie-Madeleine Dolmans (Belgium) described a new strategy using stem cell therapy to improve vascularization and follicle outcomes after grafting. Limor Man (USA) presented her research team's approach with engineered endothelial cells, which constitutively produce anti-Müllerian hormone (AMH) to boost ovarian tissue graft survival. Daylon James (USA) discussed other possible strategies, such as insulin-like growth factor 1 use, to improve follicle outcomes.

During the second half of the afternoon, two more parallel sessions took place. One was for presentation of 7 selected oral communications on basic science research, while the other saw the Asian Society for Fertility Preservation report updates on the current status of oncofertility in Japan, South Korea, and China.

The last session of the day on reimplantation of ovarian tissue generated a lot of interest. Didactic surgical videos were shown, illustrating different techniques by experts in the field: Jacques Donnez (Belgium) and Dror Meirow (Israel). An interesting lecture on indications for fertility preservation in children was also given by Sherman Silber (USA). At the end, a debate on the risks of transplanting malignant cells potentially present in cryopreserved ovarian tissue was conducted by Dror Meirow (Israel) and Marie-Madeleine Dolmans (Belgium). Because of the great enthusiasm for the subjects chosen for this session and the novelty of data presented, numerous questions were raised by the audience, particularly about indications for fertility preservation in pediatric and leukemia patients.

On the last day of the congress, Hamish Wallace (UK) described how to assess the ovarian reserve in healthy females and after exposure to toxic agents in a session exploring the effects of chemotherapy on the ovary, highlighting the advantages and disadvantages of using AMH as a marker of ovarian reserve. Dror Meirow (Israel), on the other hand, revealed the mechanisms underlying ovarian damage induced by chemotherapy and reported potential targets to reduce and/or prevent gonadotoxicity. Michael von Wolff (Germany) then explained the different IVF stimulation protocols applicable to patients undergoing chemotherapy. After all these compelling lectures, we heard from Zeev Blumenfeld (Israel), who reflected on the controversial use of gonadotropin-releasing hormone agonists in order to protect the ovary during chemotherapy. To close this first session of the day, Kutluk Oktay (USA) gave an update on the American Society of Clinical Oncology practice guidelines on fertility preservation in cancer patients.

In the second morning session, 6 more selected oral communications on clinical research were presented by young scientists.

The afternoon began with an interesting debate between Claus Yding Andersen (Denmark) and Nao Suzuki (Japan) on slow freezing versus vitrification. The last session of this exceptionally high-level congress saw S. Samuel Kim (USA) and Rebecca Flyckt (USA) discuss allogeneic transplantation of ovarian tissue and the uterus.

At the final session, Tommaso Falcone (USA), the current president, performed a closing ceremony of the congress, and

Marie-Madeleine Dolmans (Belgium) was appointed new president of the ISFP, with a new board including: Michael Von Wolff (Germany) as vice president, Nao Suzuki (Japan) as treasurer, and Debra Gook (Australia) as secretary. The newly elected president announced that the ISFP 2021 conference will be held in Brussels.

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