

On measuring advances in human ARTs, one step at a time

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“All progress is precarious, and the solution of one problem brings us face to face with another problem.”

Martin Luther King, Jr.

While it has been customary in our final issue of JARG over to review the many remarkable advances over the past year in reproductive medicine and biology, we choose instead to proffer our readership subject matter of mounting interest: cryopreservation in all its shapes and forms. The conversation on cryobiology is a timely one owing to the pervasive adoption of cryopreservation technologies in the management of fertility and infertility. That this field has altered the daily practice of human ARTs would, to none, be an understatement. And to most, the perception of progress based on the implementation of all things “cryobiological” has become taken for granted despite the warning inherent in the words of Martin Luther King, Jr.

The foundations of our modern day tools for cryopreservation as applied to reproduction can be traced to the pioneering efforts of a rather small group of card-carrying cryobiologists.

Capsule Since the introduction of gamete freezing nearly 70 years ago, prospects for the cryopreservation and long-term storage of human gametes, embryos, and reproductive tissues have been transformed into a reality in the treatment and management of human infertility. Has the perception of progress in this dimension of human ARTs been adequately weighed against the long-term impact on offspring health?

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Among these, the late Stanley Leibo and Peter Mazur were stalwarts for having blended the disciplines of physics and biology that—once synthesized for animal gametes and embryos—were afforded the translational merits fostering application to human gametes and embryos. And voila—the current recipes and formulations more or less in use in ART laboratories today were born! For those interested in a historical and personal perspective of the roots of cryobiology, have a look at the touching piece written by Mazur following the passing of Liebo [1] and one recognizing the contributions of Mazur [2].

Fast forward to 2016, and cryopreservation in all its forms and fashions takes on a character quite different from those of yesteryear. The debates over whether to use slow freeze-thaw or vitrification-warm have subsided. On the oocyte side of things, business is booming, thanks to the ever impressive advantages offered by vitrification when it comes to “survival.” And given the facility amply adapted for cycle planning, testing, and banking, why would not the urge to “freeze-all” assume center stage in a specialty that fittingly rationalizes choices for treatment strategies based on the perception of progress that has been reached in the field of cryopreserving all cells and tissues of reproductive ilk?

Given the resurgence of concerns raised in recent studies that have garnered much attention as to acute impacts [3], and the telling discussions regarding how we go about designing studies at the heart of human ARTs that will beyond a doubt report on the risks to offspring [4], we begin our coverage this month with several articles ranging from reviews to original data aiming to extend the “freeze-all” conversation.

At the other end of the cryopreservation spectrum is a series of papers dealing with the topic of ovarian tissue cryopreservation. While questions remain regarding the freezing

protocol that yields the best results in terms of follicle survival and the functioning of transplanted tissue, insights into the basic mechanisms underlying primordial follicle activation have been obtained, and plausible avenues for manipulating this vital aspect of ovarian physiology are discussed by Silber. Looming large in the area of cryopreservation remains the matter of how standardization of freezing protocols will be tested and implemented given the challenges attendant to the interpretation of studies deploying sometimes widely variable procedures and reagents.

Our issue this month also features the topic of oxidative stress, here in the context of male infertility. The extent to which lifestyle or specific medical conditions affects the viability and function of sperm is considered in several papers and an important contribution to this ongoing debate is provided in a letter to the editor from Professor Aiken.

And finally, we offer a small but measurable tribute to someone whose ties to JARG cannot be overlooked. In his role as Chief Scientific Officer at the ASRM, spanning some 12 years, Andy LaBarbera set into action a host of changes that have forever altered the form and function of the Society most significantly in the realm of education. While his general accomplishments and contributions to ASRM have been well recognized, the lasting influence and direction he provided JARG is unlikely to have been at all appreciated by our readership.

Andy and I have been colleagues and friends for many years, having launched our careers in the heyday of reproductive biology when obtaining NIH funding for research was not

the gaming exercise it is today. While his career path took him to and through the field of human ARTs, I remained in the ivory tower of academia until very recently. It was some 8 years ago that a phone call from Andy piqued my amorphous interest in an EiC position that was soon to open since ASRM had recently negotiated a partnership role with Springer on JARG. Focal to our most primordial of conversations at that time was the subject of how basic science discoveries could and/or should move to clinical application. Along the pathway to what JARG has become, I have to thank Andy—for his patience, for his inspiring and relentless enthusiasm, and for the tireless commitment he has made that besides shaping JARG, has brought an element of respect and discrimination that has elevated the field of reproductive medicine.

Thank you, Andy!

References

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