

Fertility cryopreservation in Oxford, UK

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Late effects of cancer treatment may cause premature infertility in children and adolescent cancer survivors. Oxford applied for UK license for cryopreservation of ovarian and immature testicular tissue (ITT) for patients requiring gonadotoxic treatment. This required validation with animal/human studies, development of protocols, information, staff training, establishing costs/funding source. Oxford recruited first set of patients in 2013. Patients eligible for treatment intent is curative, cytotoxicity high risk, age <40 years (females) and boys pre-pubertal. Patients consented prior to day of surgery. Ovarian tissue from 145 females, age 10 months – 39 years cryopreserved (14% with benign diagnosis), testicular tissue (ITT) from 31 boys, (0.9–13.6 years). Referrals from oncologists/hematologists and patients, most patients travel to Oxford for surgery scheduled to coincide with other interventions (minimizing risk of anesthesia). Right ovary procured using laparoscopic oophorectomy, wedge testicular biopsy procured via midline incision. Tissue bank technician collects tissue and dissects within cleanroom, producing ovarian cortical strips (1x1x5mm) containing primordial follicles or testicular segments (2x2x2 mm) containing spermatogonial stem cells. Histological evaluation reviews viability and presence of metastatic cells. Immature oocytes collected for *in vitro* maturation (IVM) and vitrified. Cryopreservation of ovarian tissue requires ethylene glycol, sucrose, human albumin serum, slow controlled freezing (manual seeding at 8°C) and vapor phase nitrogen storage. DMSO is used for ITT. Tissue is stored until the patient is cured and confirmed infertile. 86 live births following ovarian tissue transplantation was recorded. A live birth in ITT is successful in animal studies only. Patients with hematological malignancy will use vitrified oocytes (gametes are free from residual disease). For other females and ITT patients, tissue will be matured *in vitro* (IVM) to develop primordial follicles/spermatogenesis for use in conventional ART. Oxford University researchers currently are optimizing IVM techniques (three dimensional/organ culture studies). All details were registered in OTCP database. Service evaluation (interviews with patients/parents) confirms patients/parents understood risks/potential for fertility restoration. Setting up the Oxford service has been challenging due to evolving UK legislation. Referrals are from all UK centers.

Biography

Jill Davies graduated from Coventry University in 1987 with a degree in Applied Biology. After university studies, she worked for cardiothoracic surgeons Mr. Donald Ross & Sir Magdi Yacoub at the National Heart Hospital in London and that she opened the heart valve bank at the Oxford University Hospital in Oxford, England in 1990. The Oxford bank supplies cardiovascular tissue, corneas for transplant and research and brains & spinal cords for research. It is now also an Oxford Research Center Bio bank. She is also an executive member of the BATB, member of AATB, SLTB, and Society for Cryobiology.

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