



UNIVERSITY OF SASKATCHEWAN

Western College of  
Veterinary Medicine

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# Ultrasonography & Embryo Transfer Workshops

Western College of Veterinary Medicine  
University of Saskatchewan  
Saskatoon SK S7N 5B4 Canada

*Ultrasonography Workshop (May 5-7, 2023)*

*OPU Practice for registered Ultrasonography and Embryo Transfer registrants (May 8, 2023)*

*Embryo Transfer Workshop (May 9-11, 2023)*

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Organized by the One Reproductive Health Program

**ULTRASONOGRAPHY & EMBRYO TRANSFER WORKSHOPS 2023**  
PROGRAM AT A GLANCE

<b>Date</b>	<b>Time</b>	<b>Ultrasonography Workshop</b>
<b>Fri. May 5</b>	AM	<b>Lectures:</b> <i>Ultrasound basics, applications, and techniques</i> <i>Examination of a non-pregnant and pregnant cow</i>
	PM	<b>Lab:</b> <i>Wet lab demonstration and scanning practice</i>
<b>Sat. May 6</b>	AM	<b>Lectures:</b> <i>Examination of the bull, mare, small ruminants, and camelids</i> <i>Ovum pick-up (OPU) and optimizing embryo production</i>
	PM	<b>Lab:</b> <i>Live ultrasound demonstrations &amp; practice session with different species</i>
<b>Sun. May 7</b>	AM	<b>Lectures:</b> <i>Reproductive physiology – practical implications</i> <i>In vitro embryo production</i> <i>Sperm evaluation and handling</i>
	PM	<b>Lab:</b> <i>Live OPU demonstration and hands-on training</i> <i>Oocyte evaluation and IVM procedures</i>
<b>Mon. May 8</b>	AM	<b>Lab:</b> <i>Additional OPU practice for registered ultrasonography and embryo transfer registrants</i>
	PM	
<b>Date</b>	<b>Time</b>	<b>Embryo Transfer Workshop</b>
<b>Tue. May 9</b>	AM	<b>Lectures:</b> <i>Embryo transfer: history and applications</i> <i>Superovulation, embryo collection and transfer</i> <i>Embryo development, evaluation and handling</i>
	PM	<b>Lab:</b> <i>Embryo collection and transfer</i>
<b>Wed. May 10</b>	AM	<b>Lectures:</b> <i>Basic cryobiology, embryo freezing, labeling straws</i> <b>Lab:</b> <i>Embryo collection, washing, freezing, and transfer</i>
	PM	<b>Lab:</b> <i>Embryo collection and transfer</i> <i>Embryo washing, labeling and freezing</i>
<b>Thur. May 11</b>	AM	<b>Lectures:</b> <i>Estrus synchronization &amp; recipient management</i> <i>CETA certification and biosecurity</i> <b>Lab:</b> <i>Semen cryopreservation and CASA analysis</i>
	PM	<b>Lab:</b> <i>Embryo collection and transfer</i>

# DETAILED SCHEDULE

Friday, May 5 (ULTRASONOGRAPHY WORKSHOP – DAY 1)

<b>Time/Location</b>	<b>Schedule</b>	<b>Instructors</b>
8:00-8:30 <i>Rm 2104</i>	<b>Registration</b>	
8:30-8:40 <i>Rm 2104</i>	<b>Introduction</b> <ul style="list-style-type: none"> <li>• Welcome and Introduction - faculty &amp; assistants</li> <li>• Proceedings, references and textbooks</li> </ul>	Dadarwal
8:40 - 9:40 <i>Rm 2104</i>	<b>Ultrasound basics</b> <ul style="list-style-type: none"> <li>• Characteristics of ultrasound waves &amp; echoes</li> <li>• The transducer: pulse emission and reception</li> <li>• Signal processing and modalities</li> <li>• B-mode image formation</li> </ul>	Adams
9:40-10:00 <i>Corridor</i>	<b>Health Break</b> Opportunity to visit with company representatives	
10:00-11:00 <i>Rm 2104</i>	<b>Applications/Techniques</b> <ul style="list-style-type: none"> <li>• Transrectal, transvaginal and transcutaneous approaches</li> <li>• Doppler imaging</li> <li>• Image interpretation &amp; artifacts, bioeffects</li> <li>• Ultrasound biomicroscopy and image analyses</li> </ul>	Singh
11:00-12:00 <i>Rm 2104</i>	<b>Examination of the non-pregnant cow</b> <ul style="list-style-type: none"> <li>• Follicular and luteal dynamics during the estrous cycle</li> <li>• U/S examination of cyclic changes in ovaries and uterus</li> </ul>	Adams
12:00-1:00 <i>Buffeteria</i>	<b>Lunch Break</b>	
1:00-2:00 <i>Rm 2104</i>	<b>Examination of the pregnant cow and abnormalities</b> <ul style="list-style-type: none"> <li>• Bovine: Diagnosis, development, twinning</li> <li>• Fetal sex diagnosis</li> <li>• Ovarian &amp; uterine abnormalities</li> </ul>	Dadarwal
2:00-3:00 <i>Anatomy Lab</i>	<b>Wet lab &amp; demonstration</b> <ul style="list-style-type: none"> <li>• Live cow demo</li> <li>• Machine set-up &amp; buttonology</li> <li>• Machine care &amp; maintenance</li> </ul>	Team
3:00–3:30 <i>Outside of lab</i>	<b>Health Break</b>	
3:30-5:00 <i>Anatomy Lab</i>	<b>Scanning practice</b> (4 x 15 min. rotations, and final 30 min.) <ul style="list-style-type: none"> <li>• Rotations with water bath specimens</li> <li>• Machine set-up and buttonology</li> <li>• Going from 2D to 3D (examination on mystery organs)</li> </ul>	Team

*Note: ultrasound equipment will be provided, but participants are welcome to practice with their own equipment*

**Saturday, May 6 (ULTRASONOGRAPHY WORKSHOP – DAY 2)**

<b>Time/Location</b>	<b>Schedule</b>	<b>Instructors</b>
8:30-9:15 <i>Rm 2104</i>	<b>Ultrasound examination of:</b> <ul style="list-style-type: none"> <li>• Bull</li> <li>• Mare</li> <li>• Small ruminants and camelids</li> </ul>	Dadarwal
9:15-10:00 <i>Rm 2104</i>	<b>Ultrasound-guided ovum pick-up (OPU)</b> <ul style="list-style-type: none"> <li>• Equipment (handles, needles, vacuum, flow rate, temp.)</li> <li>• COC collection technique</li> </ul>	Singh
10:00-10:15 <i>Corridor</i>	<b>Health Break</b> Opportunity to visit with company representatives	
10:15-11:00 <i>Rm 2104</i>	<b>Optimization of embryo production in the IVF Lab</b>	Stroebech
11:15-12:15 <i>BTU</i>	<b>Ultrasound-guided ovum pick-up lab demonstration</b> <ul style="list-style-type: none"> <li>• Demonstration of OPU</li> </ul>	Adams
12:15-1:00 <i>Buffeteria</i>	<b>Lunch Break</b>	
1:15-2:45 <i>Dairy Barn</i>	<b>Live demonstration session</b> <ul style="list-style-type: none"> <li>• Early pregnancy diagnosis</li> <li>• Fetal sex diagnosis</li> </ul>	Team
3:00-3:50 <i>BTU &amp; Repro barn</i>	<b>Practice session</b> (see table) Rotations (x2) with: <ul style="list-style-type: none"> <li>• cows (pregnant &amp; non-pregnant), mares, llamas, ewes and rams</li> <li>• water baths (pregnant and non-pregnant)</li> </ul>	Team
3:50–4:05 <i>BTU</i>	<b>Health Break</b>	
4:05-5:20 <i>BTU &amp; Repro barn</i>	<b>Practice session</b> (see table) Rotations (x3) with: <ul style="list-style-type: none"> <li>• cows (pregnant &amp; non-pregnant), mares, ewes and rams</li> <li>• water baths (pregnant and non-pregnant)</li> </ul>	Team
5:30 <i>BTU</i>	<b>Clean-up &amp; concluding remarks</b>	Singh

*Note: ultrasound equipment will be provided, but participants are welcome to practice with their own equipment*

**Sunday, May 7 (Ultrasonography Workshop - Day 3)**

<b>Time/Location</b>	<b>Schedule</b>	<b>Instructors</b>
8:30-9:15 <i>Rm 2104</i>	<b>Ovarian physiology (fundamental and practical aspects)</b> <ul style="list-style-type: none"> <li>gonadotropins</li> <li>synchronization and superstimulation</li> </ul>	Singh/ Dadarwal
9:15-10:15 <i>Rm 2104</i>	<b>In vitro embryo production</b> <ul style="list-style-type: none"> <li>World market expansion – why? Role of the practitioner.</li> <li>Single vs superstimulated, superstimulation for OPU, sexed semen, cows and prepubertal heifers</li> </ul>	Mapletoft
10:15 – 10:45 <i>Buffeteria</i>	<b>Health Break</b>	
10:45-11:30 <i>Rm 2104</i>	<b>Sperm evaluation and handling</b>	Dadarwal
11.30-12.30 <i>Rm 2104</i>	<b>What goes on behind the closed doors of the IVF Lab?</b> <ul style="list-style-type: none"> <li>Evaluating oocytes and embryos</li> </ul>	Pioltine/Singh
12:30-1:30 <i>Buffeteria</i>	<b>Lunch Break</b>	
Rotation 1: 1:30-2:45 Rotation 2: 2:45-3:30 <i>BTU &amp; Repro barn</i>	<b>Ovum pick-up and searching lab</b> (5 stations; See table) <ul style="list-style-type: none"> <li>Setup and practice with excised ovaries (30 min)</li> <li>Rotations (45 min. – 1 operator + 1 assistant collect 1 ovary from the 10 superovulated cows)</li> <li>2/3 of class doing OPU</li> <li>1/3 in lab for searching, grading, &amp; IVM</li> </ul>	Team
Rotation 3: 3:30-4:30 <i>BTU &amp; Repro barn</i>	<b>Ovum pick-up and searching lab</b> (5 stations; See table) <ul style="list-style-type: none"> <li>Continued as above (collect oocytes from 5 superov. cows)</li> <li>COC grading</li> </ul>	Team

**Monday, May 8 (OPU Practice)**

Additional OPU practice for registered participants

<b>Time/Location</b>	<b>Schedule</b>	<b>Instructors</b>
8:30	<b>Meet in Room 2104</b>	
8:45-10:30 <i>BTU &amp; Repro barn</i>	<b>Ovum pick-up and searching lab</b> (5 stations; See table) <ul style="list-style-type: none"> <li>Continued as on Day 2 using 5 superstimulated cows</li> </ul>	Adams/Singh/ Colazo/ Dadarwal
10:00 – 10:30 <i>BTU &amp; Repro barn</i>	<b>Health Break</b>	
10:30 – 12:30 <i>BTU &amp; Repro barn</i>	<b>Ovum pick-up and searching lab</b> <ul style="list-style-type: none"> <li>Continued as above using 5 superstimulated heifers</li> </ul>	
12:30-1:30 <i>Buffeteria</i>	<b>Lunch</b>	
1:30 – 3:00 <i>BTU &amp; Repro barn</i>	<b>Ovum pick-up and searching lab</b> <ul style="list-style-type: none"> <li>Continued as above using 5 superstimulated heifers</li> </ul>	
3:00 – 3:20 <i>BTU &amp; Repro barn</i>	<b>Health Break</b>	
3:20 –4:30 <i>BTU &amp; Repro barn</i>	<b>Ovum pick-up and searching lab</b> <ul style="list-style-type: none"> <li>Continued as above using 5 superovulated cows</li> </ul>	

**Tuesday, May 9 (EMBRYO TRANSFER WORKSHOP – DAY 1)**

<b>Time/Location</b>	<b>Schedule</b>	<b>Instructors</b>
7:45-8:00 <i>Rm 2104</i>	<b>Registration</b>	
8:00-9:00 <i>Rm 2104</i>	<b>Embryo transfer: history and applications</b>	Mapletoft
9:00-10:00 <i>Rm 2104</i>	<b>Superovulation</b>	Mapletoft
10:00-10:15 <i>Corridor</i>	<b>Health Break</b>	
10:15-11:00 <i>Rm 2104</i>	<b>Techniques of embryo collection and transfer</b>	Mapletoft
11:00 – 12:30 <i>Rm 2104</i>	<b>Embryo development, classification, and evaluation</b>	Mapletoft et al
12:30-1:30 <i>Buffeteria</i>	<b>Lunch</b>	
1:30 – 3:30 <i>BTU</i>	<b>Wet lab: embryo collection and transfer</b>	Dadarwal & Team
3:30-4:00 <i>BTU</i>	<b>Health Break</b>	
4:00-5:30 <i>BTU</i>	<b>Wet lab: embryo collection and transfer</b>	Dadarwal & Team

**Wednesday, May 10 (EMBRYO TRANSFER WORKSHOP – DAY 2)**

<b>Time/Location</b>	<b>Schedule</b>	<b>Instructors</b>
8:00-9:00 <i>Rm 2104</i>	<b>Basic cryobiology, vitrification and equipment</b>	Anzar
9:00-10:00 <i>Rm 2104</i>	<b>Embryo freezing in practice, direct transfer and labeling straws</b>	Mapletoft
10:00-10:30 <i>Corridor</i>	<b>Health Break</b>	
10:30-12:30 <i>BTU</i>	<b>Wet lab: embryo collection, transfer, freezing</b>	Dadarwal & Team
12:30-1:30 <i>Buffeteria</i>	<b>Lunch</b>	
1:30 – 3:30 <i>BTU</i>	<b>Wet lab: embryo collection and transfer</b> <ul style="list-style-type: none"> <li>Embryo washing, labelling, freezing and records</li> </ul>	Bienia, Dadarwal & Team
3:30-4:00 <i>BTU</i>	<b>Health Break</b>	
4:00-5:30 <i>BTU</i>	<b>Wet lab: embryo collection and transfer</b> <ul style="list-style-type: none"> <li>Embryo washing, labelling, freezing and records</li> </ul>	Bienia, Dadarwal & Team

**Thursday, May 11 (EMBRYO TRANSFER WORKSHOP – DAY 3)**

<b>Time/Location</b>	<b>Schedule</b>	<b>Instructors</b>
8:00-9:00 <i>Rm 2104</i>	<b>Estrus synchronization and recipient management</b>	Colazo
9:00-10:00 <i>Rm 2104</i>	<b>CETA certification/CFIA accreditation and biosecurity</b>	Mapletoft
10:00-10:30 <i>Corridor</i>	<b>Health Break</b>	
10:30-12:30 <i>WestGen Lab</i>	<b>Demonstration: Semen cryopreservation &amp; CASA analysis</b>	Anzar
12:30-1:30 <i>Buffeteria</i>	<b>Lunch</b>	
1:30 – 3:30 <i>BTU</i>	<b>Wet lab: embryo collection, freezing and transfer</b> <ul style="list-style-type: none"> <li>• Continuing lab exercises of specific interest</li> </ul>	Dadarwal & Team
3:30-4:00 <i>BTU</i>	<b>Health Break</b>	
4:00-5:30 <i>BTU &amp; WestGen</i>	<b>Final Lab:</b> <ul style="list-style-type: none"> <li>• Exercises of specific interest</li> <li>• IVF lab –rotations to assess in vitro embryo development</li> </ul>	Dadarwal, Singh & Team