XCELL Bone Marrow Concentration System 30ml™
(SKU: XC-BMC-30 / PN: 90-012)

Single Use Only Device

▲***CAUTION:*** **Federal Law restricts the device to sale by or on the order of a physician.**

▲***CAUTION:*** **The XCELL Bone Marrow Concentration System 30ml (XC-BMC-30), is provided sterile. DO NOT use any component of the system if the packaging is opened or damaged. DO NOT clean and/or re-sterilize. Single-use only.**

COMPANY INFO: APEX Biologix is a medical device and biologics company that markets products in the fields of interventional pain management, sports medicine, and orthopedics. An industry leader, APEX Biologix provides comprehensive tools to help practitioners become successful in these disciplines.

INDICATIONS FOR USE: The XCELL Bone Marrow Concentration System 30ml (XC-BMC-30), is classified as a Convenience Kit under the General Hospital and Personal Use Devices segment of FDA's Convenience Kits Interim Regulatory Guidance (FDA-2020-D-0957). The kit is not specifically indicated.

CONTRAINDICATIONS: The XCELL Bone Marrow Concentration System 30ml (XC-BMC-30), may be contraindicated when used in a non-sterile environment, patients taking aspirin within 72 hours, drugs that affect platelet function, patients with any serious medical conditions that would make the subject unable to safely tolerate the extracorporeal blood components and/or volume required for the procedure. The blood/marrow products from this device are not to be used for transfusion.

▲***WARNING AND PRECAUTIONS:***

1. Appropriate precautions should be taken to protect against needle sticks.
2. Do not use the components in the kit if the packaging is open or damaged.
3. Do not use after expiration date.
4. Use only the QSG (Quick Start Guide) and Instruction for Use of the XC-BMC-30 system.
5. The physician and all staff who will be utilizing the XC-BMC-30 should be well versed in the use of the system, ancillary equipment, maintaining a sterile environment, trained phlebotomists, disposal of biohazards, etc.
6. The BMA/BMC sample should be used within 4 hours of blood draw.
7. The BMA/BMC is not intended to be returned to the patient's circulatory system.
8. The XC-BMC-30 system is single use. DO NOT clean or re-sterilize any part of this system. Dispose of all components immediately after procedure is complete, with special attention to placing needles in sharps containers immediately after use.
9. Venipuncture, bone marrow aspiration, and cell harvest process of the patient's blood should occur under aseptic conditions. The disposable XC-BMC-30 system, syringes, and accessories, must be properly discarded following standard biohazard guidelines after each use. Sealed sterile packages containing the XCELL XC-BMC-30 system and accessories must be inspected before opening. If seal is broken, contents may not be sterile.
10. The patient should be informed of the risks associated with whole blood and bone marrow aspiration which include, but are not limited to, hemorrhage, thrombosis formation, infection, and/or persistent pain at the site of aspiration.

▲*Patient Warning of Side Effects:*

1. As previously noted, hemorrhage (ruptured blood vessel), thrombosis formation (clotting), infection and/or persistent pain at the aspiration (blood draw) site may result.
2. Temporary or permanent nerve damage that may result in pain or numbness associated with the aspiration (blood draw) site may result.
3. Early or late postoperative infection is associated with any surgical procedure.

▲***CAUTION:*** Centrifuge: The Eppendorf 5702 (with A-4-38 rotor/bucket) and Drucker Boost4+ Flex centrifuges are the only approved centrifugation equipment for use with the XC-PRP-30 system.

Benchtop Processing Station (BPS) Basic Instructions

The Benchtop Processing Station (BPS) is provided for extracting blood components from the Concentrating Device. The gloved and masked user should remove the P30A's green Silicone Cap then, with the center shaft in the down position, install the post-centrifuged Concentrating Device with the concentration volume markings facing the user. Turning the handle counterclockwise will engage the shaft with the green Piston at the base of the Concentrating Device. Attach a 30ml Syringe. Additional counterclockwise twisting of the Knob will move the Piston upwards aspirating blood components into the attached syringe. Please see pictorial instructions below or the Benchtop Processing Station Quick Start Guide.

Note on Anticoagulant: Anticoagulant Citrate Dextrose Solution A (ACD-A) is provided with the XCELL Bone Marrow Concentrating System 30ml. Additional ACD-A (PN 70-039) may be ordered through Apex Biologix by calling 844-897-4910, email at info@apexbiologix.com or by contacting your local Apex sales representative. When ordering, please have the part number and your Medical License number ready. Only ACD-A with the following chemical makeup should only be used with the XCELL PRP Platelet Concentrating System.

If sourcing ACD-A, the chemical composition should match this specification:
Citric Acid, anhydrous, USP .....0.073 g
Sodium Citrate, dihydrate, USP .....0.220 g
Dextrose, monohydrate, USP..... 0.223- 0.245 g
Water for Injection, USP .....q.s.
pH: 4.5 – 5.5

Dosage is 4.5ml ACD-A per 25.5ml whole blood for a total volume of 30ml to be processed.

Heparin is provided with the XCELL Bone Marrow System 30ml in a concentration of 30,000usp units/ 30ml fill (1,000usp units per ml). As an anticoagulant or for Heparinizing, Heparin should be diluted 1-to-1 with saline and used 10% to blood/marrow volume.

DEVICE DESCRIPTION:

The XCELL Bone Marrow Concentration System is a single-use, sterile kit consisting of bone marrow aspiration and bone marrow concentration components. The system is a convenience kit designed to provide the physician with all components needed to support various aspiration techniques and to then

concentrate the aspirated bone marrow using provided hardware. The Eppendorf 5702 or Drucker Boost 4+ centrifuges are provided to support centrifugation needs. The system prepares bone marrow concentrate (BMC) from a small volume of blood/marrow that is aspirated at the time of treatment. The materials of the system's components consist of medical grade polymers, elastomers, and stainless steels suitable for use in medical devices.

KIT CONTENTS for XC-BMC-30 Bone Marrow Concentrating System 30ml:

(5) *10cc Syringe (Luer lock)
(2) *30cc Syringe (Luer lock)
(1) *45 Degree Bent Dispensing Tip
(1) *150um IN-line Filter, Capped
(1) 18g x 1.5" Needle
(1) *APEX P30A Concentrating Device
(4) Alcohol Prep Pad
(5) Gauze Sponge 4 x 4-8ply
(1) Utility Drape/Towel
(2) Glassine Bag
(2) *Universal Non-Vented Cap
(4) *Female Vented Cap
(4) *Male Vented Luer Cap
(1) Female-to-Female Luer Connector
(5) Traceability Labels

***Non-Pyrogenic:** All blood-contacting components (those with an asterisk) are non-pyrogenic as required by FDA.

BEST PRACTICES: Follow processing guides and protocols described below. Apply initial training and always adhere to clinical safety procedures.

XC-BMC-30 Quick Start Reference. The detailed instructions should be read first. After a clear understanding is achieved, the following quick start guide for the XCELL Bone Marrow System 30ml may be used.

XCELL BMC

by APEX BIOLOGIX

****PLEASE CREATE A STERILE WORK STATION AND BE MASKED & GLOVED BEFORE PROCEEDING****

Wipe sealing port of anticoagulant and heparin with sterile alcohol prior to accessing with a sterile needle/syringe

For questions please contact:

844-897-4910

Step 1:

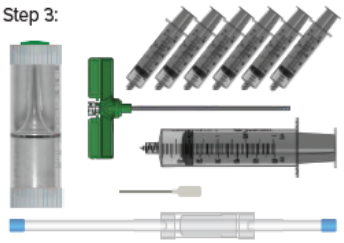
Draw 20mL of Heparin into 30mL Syringe.

Step 2:

Add the female-to-female connector, use the 30mL syringe to Heparinize the following components:

- (6) 10mL Syringes
  **Leaving 1cc of Heparin in each one*
- (1) 30mL Syringe
- 150um Filter
- Bone Marrow Needle
- Dispensing Tip
- XCELL Concentrating Device

Step 3:



Heparinize 30mL syringe before disposing of remaining Heparin. Prepare a clean working surface and layout all Heparinized contents.

Step 4:

Attach one 10mL syringe to the inserted needle and slowly aspirate marrow to the 10mL mark. Cap syringe and set aside. Repeat with 5 additional 10mL syringes until the desired 30mL amount has been collected.

Step 5:

A. Attach one of the Heparinized 30mL syringes to the 150um filter.

B. Remove cap from one of the 10mL syringes of bone marrow aspirate and connect to the opposite end of the 150um filter. Pull back slowly on the 30mL syringe pulling the bone marrow through the filter into itself.

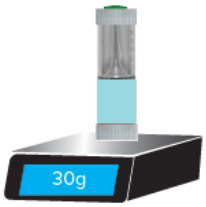
C. Repeat with the remaining (5) 10mL syringes.

Step 6:

A. Detach the filter from 30mL syringe and attach the dispensing tip in its place.

B. Slowly transfer the aspirate from the syringe into the **XCELL** concentrating device until you've reached the 30ml mark.

Step 7:



Secure the green silicone cap to the concentrating device cap. Match counterbalance to +/- 1.0g of concentrating device.

Step 8:

Place **XCELL** counterbalance and concentrating device on opposite ends inside centrifuge and spin:

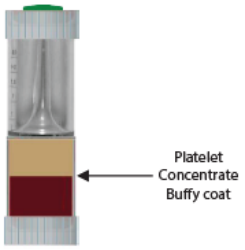
Drucker:
3900 RPM/2850 RCF
6 minutes

Eppendorf:
4200 RPM/2800 RCF
6 minutes

Step 9:

Prime a 30mL and 10mL syringe to ensure that the barrel moves freely. This is done by simply pulling back and forth on the plunger two to three times. Leave 5mL of air in the 30mL syringe to prevent splatter.

Step 10:

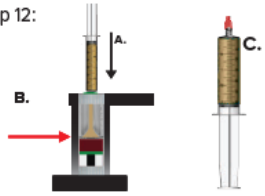


After spin, carefully remove **XCELL** concentrating device from the centrifuge. Remove the caps from Step 4.

Step 11:

Place the Concentrating Device into the Bench Top Processing Station and slowly turn the knob until the bone marrow aspirate has reached the bottom of the luer slip fitting.

Step 12:

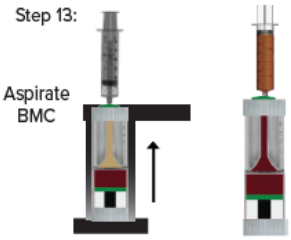


A. Place primed 30mL Syringe vertically on **XCELL** concentrating device

B. Using the Bench Top Processing Station push PPP into 30mL syringe until the buffy coat reaches 3mL (outlined on concentrating device.) (See red arrow)

C. Remove and cap 30mL syringe

Step 13:



***Keeping the assembly vertical, add the primed 10ml syringe and push the remaining BMC until the syringe captures the bu°y coat

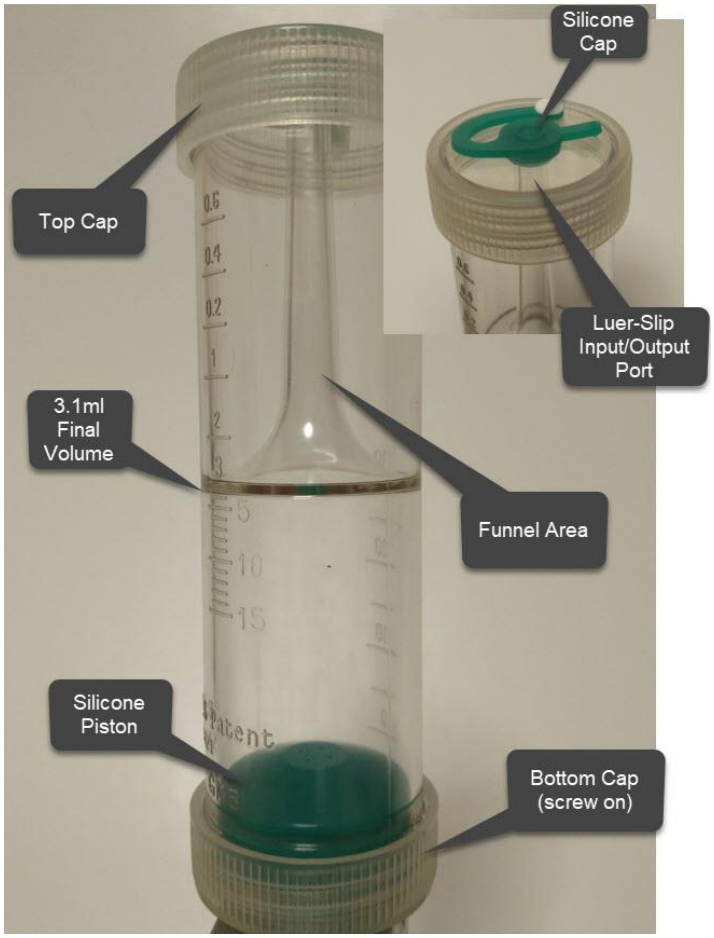
Step 14:

Cap the 10ml syringe and gently remix the suspension. The XCELL BMC process is complete

***This process provides 6-6.5ml concentrate. For higher TNC counts, continue pushing RBC into 10cc syringe to the 8-9ml mark. If lower volume is desired, push the bu°y co at above the 6ml marking on the Concentrating Device in step 12, add the 10cc syringe, and push in the desired volume.

Definitions for the XCELL PRP Concentrating Device

- Silicone Cap: Use to seal the Input/Output port. Flexible silicone, with retaining pin, for ease of use.
- Luer-Slip Input/Output Port: Add whole blood and/or aspirate PPP and PRP here.
- Top Cap: Retains the Silicone Cap.
- Piston: When used with BPS, functions to move blood components to the Output Port.
- Funnel Area: Condenses blood components to the Output Port.
- Bottom Cap: Retains the Piston.



Definitions for the BPS

- Top Plate: the retainer for the P30A Concentrating Device when loading into the BPS.
- Tower: Supports the Top Plate.
- Plunger: Driven by the Knob and moves the piston of the P30A upwards.
- Housing: Supports and encloses the internal mechanism.
- Knob: Causes the Plunger to be raised or lowered.
- Base: Provides a sturdy foundation for the BPS.
- Base Cover: Finishing for the Base.

Instructions for Use:

***Note:** Please create a sterile work station before beginning. Use standard aseptic technique with the following procedure.*

***Note:** Please ensure the Benchtop Processing Station has been cleaned prior to use. Refer to Benchtop Processing Station Maintenance Instructions.*

Note: The Scrub Tech or Scrub Nurse is abbreviated with SN. The Circulatory Nurse or Assistant is abbreviated as ANR. The following instructions and intended for a surgical center/OR and may be adapted to a clinical environment by qualified individuals.

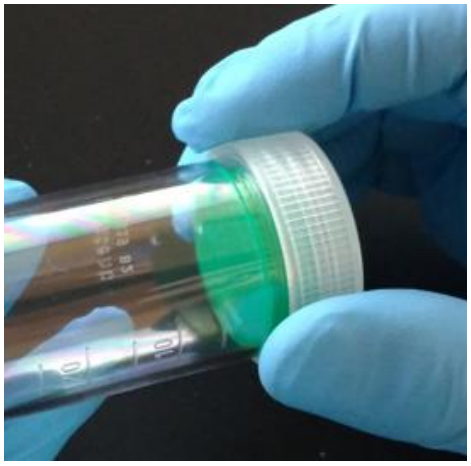
Bone Marrow Aspiration and Concentration Process:

1. After prepping the patient, the physician starts the procedure by inserting the BM needle (guided) into the upper iliac crest (right or left). After accessing the marrow, the following steps occur:
2. #1 10ml syringe (w/.5ml Heparin) is attached to the BMA needle. Using a specific method, about 7-10ml of marrow is aspirated.
3. The physician hands the filled syringe to the SN, who hands it across the field to the ANR.
4. The ANR, ensures the aspirate and Heparin are well mixed, then using the #1 30ml Syringe + 150um filter sub-assembly, pulls the aspirate through the filter and into the 30ml syringe.
5. Process 2-4 repeats until the physician has 30-32ml aspirate. The ANR communicates with the SN and physician.
6. The ANR carefully mix the BMA in the 30ml syringe.
7. The ANR removes the 150um filter and attaches the Dispensing Tip to #1 30ml aspirate syringe.
    a. Note: The SN may choose to run the filtering process on the BMA side. If so, he/she may request the #1 30ml Syringe + 150um Filter sub-assembly from the ANR before or after heparinizing.
8. The ANR transfers the aspirate into the P30A Concentrating Device filling to the 30ml mark.
9. The ANR verifies the counterbalance, loads the centrifuge with aspirate and counterbalance, and executes the cycle at 2800rcf for 6 minutes.
10. When centrifugation is complete, the ANR transfers the P30A Concentrating Device to the Benchtop Processing Unit.
11. The #2 30ml syringe is attached to the top of the P30A Concentrating Device and ~30ml of platelet-poor-plasma is pushed off. The syringe is removed, capped with #1 Universal Cap, and placed on the back-bench sterile field for optional use by the physician.
12. The #1 10ml syringe is attached to the P30A Concentrating Device and ~3ml of BMC is pushed off. The syringe is removed and capped with #2 Universal Cap.
13. The ANR notifies the SN and physician that the BMC is ready.
14. The ANR un-caps the #1 10ml BMA syringe, attaches the Female-to-Female connector and approaches the field.
15. The SN removes the cap from #9 10ml syringe, on the BMA side, and approaches the field.
16. The ANR and SN mate the two syringes with the SN drawing the BMC into that syringe.
17. The ANR grasps the Female-to-Female connector and the SN removes the 10ml syringe and caps. The BMC is ready for the physician's use.
18. The BMAC process is complete. All components are disposed of. The ANR removes the centrifuge, counterbalance and BPS as directed.

Note: It is critical to mix the Heparin with the blood/marrow immediately after aspiration is complete. Invert the capped syringe for a minimum of 15 times.

After obtaining 30ml of Bone Marrow Aspirate, proceed to the Bone Marrow Concentration steps below.

Concentrating Device and BPS Usage:



Note: before transferring to the Concentrating Device, verify the Bottom Cap is tightened securely, by rotating until the cap "clicks" into place. Overtightening may cause binding in centrifuge carriers.

1. Attach the Dispensing Tip to the 30ml Syringe containing the patient's blood/marrow then slowly transfer into the P30A Concentrating Device through the Input/Output Port. Fill to the 30ml marker.

2. Place the P30A Concentrating Device's built-in Silicone Cap over the Input/Output Port and snap into place.

3. Using a lab scale, weigh the Concentrating Device and match the counterbalance to within +/-1.0g.

4. Place the Concentrating Device and counterbalance into opposite buckets of the centrifuge and close the lid.
    a. See respective centrifuge quick-start for details.

Note: Do not mix centrifuge buckets or inserts from different machine brands.

5. Set the centrifuge to 6 minutes and 2800rcf and start the cycle.
    a. Eppendorf 4200rpm
    b. Drucker 3900rpm (or BMC 30 cycle)

6. Prime the 10ml Syringe and second 30ml Syringe leaving 5ml's of air.

Note: Leaving the 5ml air gap aids in normalizing pressure between the Concentrating Device and syringe allowing for cleaner separation of the two devices.

When centrifugation is complete, carefully remove the Concentrating Device and observe the cell layering. You should see a clear separation between red blood cells (RBC), the buffy coat and plasma.

Note: The separation between buffy coat and RBC is not as distinguished with marrow as with blood. A lipid layer may also be observed on top of the PPP. As seen in this image.

Note: Always place the BPS on a sturdy table or bench.

Critical: The BPS should be cleaned before each use utilizing the procedure found in the Benchtop Processing Station Maintenance Instructions, provided.

7. Verify the Plunger is in the full down position by rotating the Knob clockwise until the Plunger stops.

8. Prime the 30ml and 10ml Syringe's, leaving 5ml air in each.

   Note: Leaving the 5ml air gap aids in normalizing pressure between the Concentrating Device and syringe allowing for cleaner separation of the two devices.

9. Retrieve the P30A Concentrating Device, post-centrifugation, and remove green Silicone Cap. Place into the BPS in the orientation seen here.

10. Attach a 30ml syringe to the output port of the concentrating device, then gently turn the Knob counterclockwise until the Concentrating Device touches the Top Plate.

    Note: Be sure the Concentrating Device is parallel with the Tower and Plunger.

    Caution: Following these instructions carefully, minimizes the possibility of contaminating the working surfaces of the BPS with blood/plasma.

11. Slowly rotate the Knob counterclockwise to push the plasma into the 30ml Syringe until the buffy coat reaches the 3ml mark on the Concentrating Device.

Note: The XCELL system allows for flexible dose volume. Observe the ml markings on the dose-side of the Concentrating Device and adjust the stop point of the buffy coat to correlate with the desired final volume.

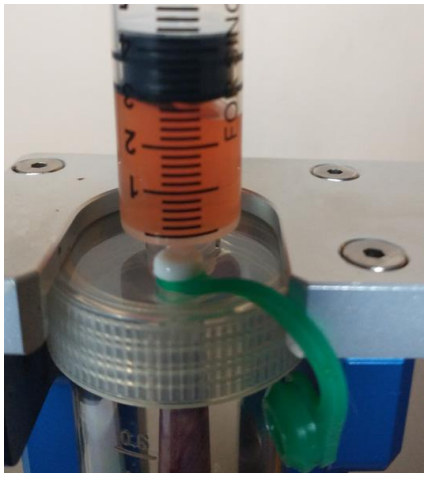
Caution: It is important to slowly rotate the Knob to minimize the possibility of contaminating the working surfaces of the BPS with blood/plasma.

12. Detach the 30ml Syringe and cap using the provided Luer Lock Universal Cap and set aside.

13. Attach the 10ml Syringe to the Concentrating Device's Luer Output Port.

14. Continue to rotate the Knob counterclockwise and push concentrate, including buffy coat, into the 10ml Syringe (3ml total).

Note: The XCELL system allows for flexible dose volume. Observe the ml markings on the dose-side of the Concentrating Device and adjust the stop point of the buffy coat to correlate with the desired final volume.



15. Retract the Plunger to full-down and remove the assembly.

16. Carefully detach the 10ml Syringe and cap using the provided Luer Lock Universal Cap.

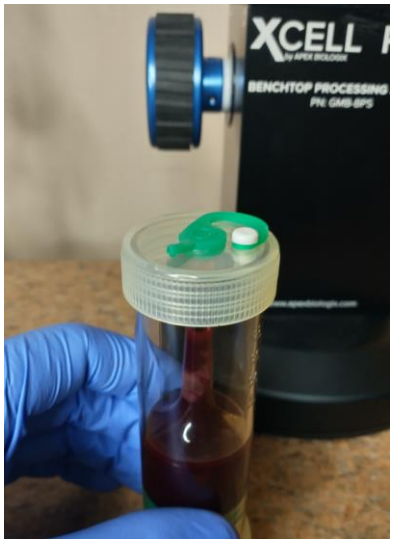
17. Gently invert the 10ml Syringe at least 15 times to re-mix the suspension.

18. Re-attach the green Silicone Cap and P30A cap and set aside.

19. BMC processing is complete

Note: Dispose of all single-use components in biohazard containers.

Note: Clean the BPS according to the "Benchtop Processing Station Maintenance Instructions" provided.



XC-BMC-30 Troubleshooting

1. Whole Blood/marrow sample appears to have "clumps"
    a. This is an indication the Heparin was not mixed after drawing. Discard, open a new XC-BMC-30 kit and review IFU.

2. Overfilled P30A Concentrating Device
    a. Using the still-sterile Dispensing Tip, attached to the 30ml draw syringe, and carefully extract blood/marrow to the 30ml-mark on the P30A Concentrating Device.

3. Centrifuge Shaking or Out of Balance Error
    a. Table/bench is unstable. Move centrifuge to stable surface
    b. Sample and Counterbalance not +/-1.0g. Adjust and restart cycle.
    c. Rotor/Bucket incorrectly installed. Refer to operator's manual provided.

4. Spun Sample appears red throughout, or has reddish PPP.
    a. Remixing has occurred; however, BMC will always be redder than PRP.

i. Check the braking setting on the centrifuge using the brand-specific user guide.
ii. Verify you have used the correct caps on the P30A Concentrating Device. See instructions.
iii. Verify centrifuge is not shaking. Move to stable surface.
iv. Check P30A Cap for correct installation.

5. For Benchtop Processing Station concerns, see "Benchtop Processing Station Quick Start Guide".

6. The Concentrating Device requires pressure to insert into centrifuge buckets/carriers and/or becomes stuck in the bucket/carrier.
   a. The Bottom Cap is overtightened. Remove the entire bucket/carrier assembly from the centrifuge, pull and twist to remove the concentrating device. Refer to step #7 of the IFU. Note that the blood sample may become remixed and unusable. Fully remix the sample, centrifuge again, and continue the procedure.

When BMA or BMC Should be Discarded?

1. If the sterility of any aspect of the protocol is in question, the sample, along with all components, should be discarded and a new XC-BMC-30 kit obtained.

2. If the timepoint from blood draw to usage exceeds 4 hours, the sample along with all components, should be discarded and a new XC-BMC-30 kit obtained. During the 4-hour timepoint samples may be refrigerated at ~4c (39F).

3. If after the PRP is prepared, the physician discovered either the XC-BMC-30 kit or ACD-A is beyond its expiration, the sample, along with all components, should be discarded and a new XC-BMC-30 kit obtained and fresh BMA draw.

4. If the patient, at any point before BMC use, reveals previously undisclosed information about medications or other health conditions the physician determines would compromise the PRP's intended use.

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IMPORTANT: Please reference XC-BMC-30, XCELL Bone Marrow Concentrating System, Lot Control number and REF number in all communications. Call or email Apex Biologix Customer Service for product questions, concerns, returns, or adverse events at 844-897-4910 or info@apexbiologix.com