1. **RELEVANCE**
   a. This SOP outlines the instructions to completing Bioelectrical Impedence Analysis (BIA) including: conducting the test, software input, and saving data, to ensure safety and reliability.

2. **SCOPE**
   a. This SOP applies to all TCRC RDs (and trained TCRC DTs).

3. **DEFINITIONS/ABBREVIATIONS**
   a. **Bioelectrical Impedance Analysis (BIA)** is a non-invasive and relatively inexpensive way to measure body composition. It also provides information about fluid status in the body, specifically total body water. BIA is often used in combination with other methods of determining body composition such as DXA scans, skin fold measurements and circumference measurements. BIA can be significantly affected by hydration status and thus is less accurate in dehydrated or over hydrated individuals.

4. **RESPONSIBILITIES**
   a. It is the responsibility of the TCRC RD and / or DT performing the BIA measurement to ensure accuracy of the measurement and documentation.
   b. The TCRC RDs are responsible for maintaining the BIA RJL system, and performing quarterly quality control.
   c. The TCRC RD or DT will complete annual competency training on conducting BIAs.

5. **PROCEDURES**

   BIA will be performed using Bioelectrical Impedence Analysis (BIA) Quantum IV RJL System or Bioelectrical Impedence Analysis (BIA) Quantum II RJL Systems and analyzed using Cyprus 2.7 Body Composition Analysis System.

   **General Considerations:**
   a. As a standard, this test will always be completed on the right side of the body, unless otherwise stated by the protocol, or if need arises due to injury/ amputation or other notable issue. The test should be kept consistent on the same side of the body (right or left) from baseline to any subsequent tests. Document any variations in the visit progress note.
   b. **Do not** test subjects with electronic devices such as pacemakers or defibrillators due to the possibility of interference with the device.
   c. **Do not** test pregnant women.
   d. The skin that will have the electrodes attached should be clean and dry. Lotion or sweat can prevent an accurate read. Clean skin with an alcohol wipe as needed.

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TCRC Bioelectrical Impedance Analysis (BIA)

BIA Testing on participant:
- a. The TCRC RD or DT will: Instruct the participant to remove right shoe and sock and lie supine with arms away from the trunk and legs slightly apart (thighs should not touch).
- b. Attach cables to BIA system.
- c. Places electrodes on the right foot as follows: The center of the first electrode should bisect the protruding anklebone with the foil tab facing outward. The second is placed just behind the middle toe with the tab facing outward.
- d. Places electrodes on the right hand as follows: The center of the first electrode should bisect the protruding wrist bone with the foil tab facing inward. The second is placed just behind the middle finger with the tab facing inward.
- e. Attach cables to the electrodes as indicated by the cables.
- f. Turn BIA system “ON.”
- g. Wait for the Resistance and Reactance to stabilize. Record on nutrition flow sheet.
- h. Disconnect cables and remove electrodes from patient’s hand and foot. After measurement has been completed, wipe down the BIA device and cables with a germicidal wipe.

BIA data analysis:
- a. TCRC RD or DT will complete analysis of data using Cyprus 2.7 Body Composition Analysis System.
- b. Open Cyprus software.
- c. Select appropriate patient data base for study.
- d. Select the “Subject Input” Tab.
- e. Enter in patient data including:
  - Note: some studies may require de-identified information. See protocol specific instructions.
  - Last Name, First name
  - Subject ID
  - Weight
  - Height
  - Age
  - Gender
  - Exercise level (As a standard always input ‘Moderate Exercise’ unless otherwise specified by study)
  - Resistance (as recorded from BIA)
  - Reactance (as recorded from BIA)
- f. After entering data select “Save Record” and ensure no mistakes have been made in inputting the data. “General information” should be green and state “There are no input errors.” If this area becomes red, correct any issues reported.

Saving BIA Data:

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a. **Using Cyprus software** (after completing BIA analysis) click the “Import and Export” Tab. Select “Export” Move exported data into SPID specific RFA file.
b. Refer to “Metabolism and Nutrition Research Secure Data Storage” SOP for more details.

**Documentation:**

a. Initial documentation may be competed on the nutrition flow sheet
b. Document completion of the test and raw data derived from the BIA into EHR.

6. **OPERATIONAL DOCUMENTS**

a. RJL Systems Quantum IV Bioelectrical Impedance Analyzer User’s Manual

7. **REFERENCE(S)**

g. TCRC SOP: “Metabolism and Nutrition Research Secure Data Storage”