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## **Impedance Ratio: new multi-frequency electrical Bio-impedance functional assessment parameter.**

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Translated from the original Portuguese presentation.

### **OBJECTIVES:**

Electrical Bio-impedance (BIA) has proved to be a practical and simple method for assessing body composition in populational studies, whenever specific formulas are used for each population. In clinical situations, body composition obtained from BIA is still quite controversial, as the physical principles on which this method is based are not valid in these circumstances. The method has also been used as a prognosis indicator in different clinical situations through applying the phase angle. This parameter may be directly obtained from resistance and reactance values without using equations. The phase angle will indicate the state of “health” of the cell membrane, which results in a functional assessment method.

In electrical Bio-impedance instruments that register only impedance values, this parameter cannot be estimated. In order to replace it, by using a multi-frequency instrument, it is possible to estimate the **impedance ratio (IR)** between the lowest and highest frequency.

Healthy cell membranes make this ratio greater than 1, whilst different unhealthy cell situations result in a ratio of approximately 1.

### **METHODS:**

With the objective of assessing the behaviour of this parameter between healthy and sick people, we are carrying out a study on 105 volunteers, 52 of which are healthy and 53 are cancer patients being treated with chemotherapy. A BIA analysis was carried out with a multi-frequency instrument (**Bodystat®Quadscan**) with frequencies of 5, 50, 100 and 200 kHz, following a high standard technique. The statistics were calculated by means of the STATA 8 programme, by using tests t and ANOVA.

### **RESULTS:**

The average values of the IR between patients (IR = 1.22) and healthy voluntaries (IR = 1.28) were extremely different ( $p < 0.001$ ). When only patients receiving chemotherapy were analyzed, no statistically significant difference was found between the different types of tumours and patients with gynaecological and lung cancer tended to present lower values.

### **CONCLUSION:**

**We can now conclude that IR is an alternative for the functional assessment of the cell membrane, which may be used as a prognosis indicator in clinical situations.** Longitudinal studies in different clinical situations as well as intervention studies may be carried out in order to prove their performance.