Nutritional status assessed by bioimpedance vector analysis in Alzheimer's dementia: a longitudinal study.

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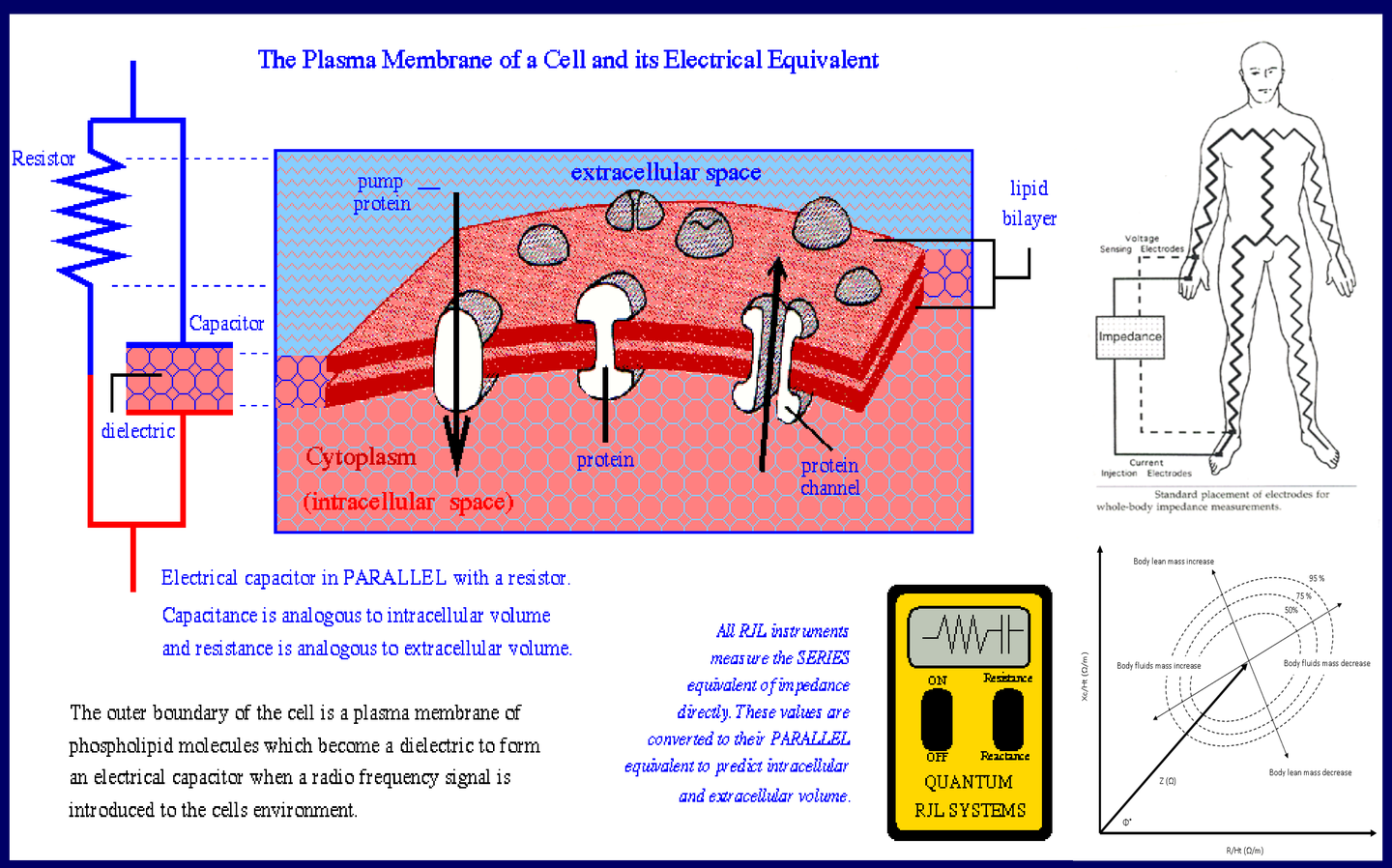
Background: Nutritional status assessed by bioelectrical impedance vector analysis (BIVA) was significantly different in patients with Alzheimer's disease (AD) with respect to healthy controls (HC) and subjects with Mild Cognitive Impairment showed an intermediate pattern between AD and HC [1].

Objective: The aim of this study was to analyze if bioelectrical parameters can be considered as progression markers of AD.

Methods: In a University-Hospital setting, we performed a longitudinal study recruiting 40 patients with AD (25 women, 15 men). Nutritional status was evaluated at baseline and at follow up visits by anthropometry (body mass index; calf, upper arm and waist circumferences), Mini Nutritional Assessment (MNA), BIVA variables [phase angle (PA) , ratio of resistance to height (Rz/h), ratio of reactance to height (Xc/h)].



Statistical analysis: Kolomogorov-Smirnov (K-S) test showed a parametric distribution of variables of interest, so parametric statistics were applied. Variables were analysed by t-test for repeated measures and linear regression analysis; the same analysis were repeated within gender with appropriate statistics indicated by K-S test.

Results: After 8.7 ± 3.6 months, AD patients showed a significant worsening of MiniMental State Examination (MMSE) (19.4 ± 4.5 vs.18.3 ± 5.2, p= 0.04) , Clinical Dementia Rating Scale (CDR) (1.7 ± 0.7 vs. 2.1 ± 0.7, p < 0.001), Activity of Daily Living (ADL) scores (4.0 ± 0.3 vs. 3.6 ± 0.3, p= 0.02). Anthropometric and bioelectrical variables did not significantly change during follow up (Table 1), even when analysed within gender, except for women's upper arm circumference (24.2 ± 2.7 vs. 23.6 ± 2.7, p= 0.049)

A linear regression model with phase angle as dependent variable and time of follow up and MMSE score change over time as independent variables did not yield significance.

Table 1: Clinical, functional and nutritional variables in AD at baseline (T0) and follow-up (T1).

	AD T0	AD T1	p
MMSE	19.4 ± 4.5	18.3 ± 5.2	0.042
ADL (lost)	2.0 ± 1.8	2.4 ± 1.8	0.025
IADL (lost)	4.6 ± 2.0	5.0 ± 1.8	0.084
CDR	1.7 ± 0.7	2.1 ± 0.7	< 0.001
BMI	24.5 ± 3.7	24.4 ± 3.4	0.329
CB	24.2 ± 2.9	24.0 ± 3.1	0.724
CP	31.5 ± 2.9	31.2 ± 3.1	0.227
CA	86.6 ± 10.6	86.1 ± 10.7	0.568
Rz/h	296.9 ± 46.0	296.4 ± 52.4	0.882
Xc/h	29.2 ± 5.4	29.7 ± 5.8	0.404
PA	5.6 ± 0.7	7.1 ± 9.1	0.289

Conclusions: Bioelectrical parameters did not significantly change in AD patients during the time of follow up of our cohort. This result could indicate that BIVA, even if is able to distinguish AD from HC, cannot be used a marker of disease progression. A longer follow up and a larger cohort could aid to understand the effective time of change of these nutritional biomarkers.

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References

1 Cova I, Pomati S, Maggiore L, Forcella M, Cucumo V, Ghiretti R, Grande G, Muzio F, Mariani C. **Nutritional status and body composition by bioelectrical impedance vector analysis: a cross sectional study in Mild Cognitive Impairment and Alzheimer's disease..** PLoS One. 2017 Feb 10;12(2):e0171331.