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Ultrastructural changes of the intestinal mucosa in Non-Celiac Gluten Sensitivity patients could represent an early indicator of cellular stress

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Non-Celiac Gluten Sensitivity (NCGS) is a wide-spreading syndrome and an emerging problem in clinical practice linked to the increase of gluten content in some populations diet. It is characterized by intestinal and/or extra intestinal symptoms that improve or disappear after removing gluten from diet in non-celiac or non-wheat allergic patients [1]. In order to perform and support a precise and early diagnosis, as others recently suggested [2], the aim of this work was to analyze in detail ultrastructural features of the duodenal mucosa. Biopsy specimens were obtained from 10 patients who underwent gastrointestinal endoscopy for a diagnostic check-up at the Department of Gastroenterology of the University of Chieti and prepared for electron microscopy. Semithin sections were blindly observed but only biopsies showing well-shaped intestinal villi were selected for the ultrastructural study, observed with a ZEISS EM109 equipped with a Gatan videocamera. We analyzed: 1) brush border, 2) epithelial cell cytoplasm, 3) cellular junctions and 4) the villus connective axis with respect to inflammatory cell number and vascular alterations, evaluating amount and localization of cellular damages. Interestingly, only 3 of these biopsies, obtained from subjects in which clinical history and diagnosis was uncertain, presented fine spot damage in the epithelium from intestinal villi with an apparently normal morphology. Some epithelial cells showed sever distress such as heterochromatic and nuclei not-round shaped, dilated endoplasmic reticulum, increased number of mitochondria and a messy brush border thinned and reduced in width. Numerous damaged cellular junctions and remarkable basal detachment of cell plasma membranes were observed. These findings pave the way to a deepen characterization of intestinal mucosa from NCGS patients to identify, by means of electron microscopy, potential morphological and functional markers of NCGS.

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Keywords

NCGS; duodenal villi; ultrastructural morphology.