Exploration of the Possible Association between ABO Blood System and Periodontal Disease

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Periodontal disease (PD) characterized by a multifactorial etiology and affect a large population worldwide. Dental plaque accumulation is the main etiologic factor, however genetic factors seem to play an important role in PD pathogenesis [1]. Consequently, it would be interesting to focus on the influence of genetic factors in PD patients and to investigate the possible association between those and PD. One of those factors is the ABO blood group system and it would be important to investigate if the antigens of the ABO blood group have somehow increased the susceptibility to the PD.

PD has a multifactorial etiology and the pathogenesis of the disease has not been completely determined yet, whereas an amount of studies have suggested that genes play one of the crucial roles in PD development [2].

The ABO blood groups system was discovered decades ago [3] and its antigens consist bio-chemical indices that are expressed in several cell types including erythrocytes, gastrointestinal cells, lung epithelial cells, mucosa cells, plasma and other body fluids [4].

An association has been recorded between the presence or absence of the mentioned ABO blood group system and several diseases and disorders, whereas those antigens also can be acted as receptors for infectious agents. Immuno-histochemical reports have demonstrated the presence of A and B antigens on spinous cells in the non-keratinized oral epithelium of blood group A and B, where basal cells express precursor structures and the more-differentiated spinous cells express the A or B antigens. Individuals with blood group O who do not have the A and B gene-coded glycosyl-transferase express a fucosylated variant (LeY) of the precursor structure [5].

The antigens of ABO blood system are located on carbohydrate oligosaccharide chains, which are parts of glycosphingolipids or gp molecules. Those ABO genes directly encode for the enzymes that add specific glucose molecules to the erythrocytes membrane and those molecules consist the ABO blood system antigens [6].

In addition, it has been recorded that carbohydrates can act as receptors for Porphyromonas gingivalis, that plays a critical role in PD pathogenesis [7].

An increasing number of researchers have recorded that the ABO blood group plays an important role in several disorders and pathological condition as has already mentioned and the possible link between ABO blood group and susceptibility to chronic disease as an example of genetic basis for family predisposition has also been investigated [8].

To be more specific an association between inherited human ABO blood group antigens with diseases such as coronary heart disease [9], ischemic stroke [10,11] and several types of malignancies [12,13] including pancreatic cancer [14-16], renal cell carcinoma [17], ovarian cancer [18], colorectal cancer [19-21], gastric cancer [22-24], hematological malignancies [25] and lung cancer [26-31] was recorded. However, the data on the role of ABO blood group factor in lung cancer is limited and inconsistent [3].

Despite the fact that a great amount of reports have been carried out to examine the possible relationship between ABO blood group system and the incidence of several diseases and disorders, a limited amount of studies have investigated the relationship and the incidence regarding oral and dental diseases such as PD and the possible association with ABO blood group system.

Significant relationships have been observed between ABO blood group system and several oral diseases such as dental caries [32], salivary gland tumors [33] and oral cancer [34].
Regarding the examined relationship between ABO blood group system and PD, in some reports a significant association has been observed [32,35-43]. On the contrary, no significant associations have been recorded in few studies [39,44,45], whereas other researches [5,32] recorded that different ABO blood groups may show significant differences in the rates of colonization of a number of periodontal pathogens that are the main etiologic factors of PD.

The mentioned controversial findings could be attributed to the geographic diversity in the population groups.

It is complicated and difficult to elaborate a possible hypothesis on why individuals with particular ABO blood group have been found in increased frequency in periodontitis groups, or in various grades of periodontal involvement. However, the development of PD, gingivitis and periodontitis is a result of many known and unknown factors and the possible genetic influence maybe is responsible for a small rate of the multifactorial etiology of PD.

In conclusion, despite any contradictory views, the ABO blood system may play a role as a potential risk factor for PD development. It is obvious that exists an urgent need for further investigation.

Conflict of Interest
None.

Bibliography
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