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Editorial

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Alkaline phosphatases, B6 vitamers and pre-eclampsia

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Dear Editor, when studying potential molecular therapeutic targets in glioblastoma multiforme, we perceive an alternative point of view to understand the pathophysiology of the specific hypertensive disease of gestation. Would be the catalytic deficiency of alkaline phosphatases, in inflammatory syncytiotrophoblast, partially responsible for the pre-eclampsia hypertension and the seizures?

We explain: alkaline phosphatases are potential markers both of cell undifferentiating as the refractoriness in glioblastomas [1] and our group alluded to the possibility that the catalytic functioning of these promiscuous enzymes [2] could generate, from phosphate substrates, locally cytotoxic products to cancer stem cells.

In addition, the saturation of the enzyme would inhibit the absorption of others physiologically important substrates such the vitamers of B6, whose intracellular transport is obligatorily preceded by the action of alkaline phosphatases [3]. Mutations in the ALPL gene are responsible for the disease neonatal hypophosphatasia; in these neonates showing signs of osteomalacea the alkaline phosphatases are not catalytically effective, leading to death by seizures secondarily to intracellular scarcity of B6 vitamers despite his high extracellular levels [4].

The placenta on pre-eclampsia progressively become insufficient secondary to inflammatory mechanisms similar such the anti-phospholipid antibody syndrome [5] and is associated with an immune imbalance where pro-inflammatory CD4 (+) T-cells are increased and T regulatory cells are decreased [6]. Anatomopathological analysis of placentas from pre-eclampsia patients describes higher concentrations of alkaline phosphatases in syncytiotrophoblast compared to normal gestation [7], and the catalytic activity of alkaline phosphatases in pre-eclampsia are increased compared to the normal pregnancy [8].

The low functioning of alkaline phosphatases in the acid and inflammatory syncytiotrophoblast may be partially responsible for hypertension and the seizures seeing in pre-eclampsia, since a) vitamin B6 intracellular deficiency produces high blood pressure [9] and seizures [10]. b) there is a direct relationship between the severity of pre-eclampsia and blood levels of alkaline phosphatases [11]. c) Despite the preventive antiepileptic mechanism of magnesium sulfate not be totally elucidated [12], it could be related to the fact that magnesium is a cofactor for catalytic actions in alkaline phosphatases [13,14].

If there is in fact a decrease in the catalytic functioning of the alkaline phosphatases in the syncytotrophoblast of pregnant with pre-eclampsia and consequent restriction to the absorption of B6 vitamins to the fetus, some heroic measures in emergency room perhaps could help in the control of hypertension and seizures: as the maximal oxygenation added to complex B parenteral; the administration alpha Asfotase, a new drug already used in neonatal hypophosphatasia, or the offer venous of B6 vitamers, already without phosphate group, like pyridoxine hydrochloride.

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