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Effect of Aluminium on Lead and Iron Transport into astrocytes and V373 cells

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We had previously reported some results which Divalent metal transporter 1(DMT 1) is not major route although it is involved in lead uptake into astrocyte. Levels of lead uptake at pH 7.4 were 10 times more higher than at pH 5.5. We had investigated effects of 4,4'-diisothiocyanostilbene-2,2'- disulfonic acid, disodium salt(DIDS), Furosemide, Probenecid, Cyano-hydroxycinnamic acid(CHCA) and Niflumate as a inhibitor. At pH 7.4 lead uptake was the highest level, and only DIDS inhibit lead uptake but others did not. Various metal ions interact to uptake of metal ions each other. It was suggest that neurotoxicity of aluminum were indirectly induced as it affect to uptake of another ion.

In this study we investigated effects of aluminum ion on transport of lead and iron into astrocytes and V373 cells. We used Immortalized human fetal astrocyte(SV-FHA) cells V373 cells. SV-FHA cells were cultured in high-glucose DMEM and V373 cells cultured low-glucose DMEM. Cells were treated with Aluminium chloride. Lead uptake were done in incubation condition of pH 5.5 and 7.4. in accordance with previous used method. Iron uptake was done in 20mM HEPES buffer containing serum-free, 6 μM NTA, 2mM $CaCl_2$, 2mM $MgCl_2$, 15 μM Ascorbic acid, and 1.5 μM $FeCl_3$.

Lead uptake into astrocytes increased time-, pH-, and concentration-dependently, and was saturable. Aluminium increased time- and concentration-dependently lead uptake into V373 cells and astrocytes. Aluminium increased time- and concentration-dependently Iron uptake into V373 cells, and Citrate didn't significantly affect on increment of iron uptake by aluminum.

Key word : Aluminum, Iron uptake, Lead uptake, V373 cell, Astrocyte