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Concentration-Dependent Uptake of the Microcystin-RR Toxin in Human Placental Cell Lines

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Abstract:

Background and Purpose: Harmful algal blooms result in the production and release of cyanotoxins by cyanobacteria. One prominent class of cyanotoxins found in freshwater nationwide are microcystins. Microcystins are actively transported into cells such as hepatocytes where they inhibit protein phosphatases and disrupt cellular homeostasis. Little is known whether microcystins, including the RR congener (MC-RR) can enter other tissues including the placenta.

Methods: In this study, we sought to determine whether human placental cells exhibit concentration-dependent uptake of MC-RR. For this purpose, three placental trophoblast cell lines, cytotrophoblast JAR and BeWo cells, and extravillous trophoblast HTR8/SVneo cells were incubated with MC-RR at concentrations of 0.1, 1, and 10 μ M for 3 hours. Western blotting was used to observe proteins adducted by MC-RR at a molecular weight of 36 kDa.

Results: Significant uptake of MC-RR was observed at the highest concentration (10 μ M) for all 3 cell lines. Furthermore, only the JAR cells exhibited significant uptake of MC-RR at the 1 μ M concentration.

Conclusions: Ongoing studies are evaluating the susceptibility of human placenta cells to cyanotoxin cytotoxicity and identifying the transporters responsible for active uptake. This research will be important for determining whether the placenta is a target of cyanotoxin injury.

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