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Perspective

The Impact of Zinc Supplementation on Immune Cells

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DESCRIPTION

Zinc is required for the production of disease-fighting immune cells known as T cells, as well as the regeneration of the thymus, the immune organ that produces T cells. Zinc, thymic regeneration, and immune function are molecular pathway and cell types that control the immune system's thymus heal by itself after injury. Such treatments could help vaccines work better and speed up thymic regeneration after stressors like chemotherapy, blood stem cell transplants, and radiation.

The low zinc levels are associated to fewer infection-fighting T cells and a shrinking thymus, where T cells develop, researchers investigated the ways to supplement with zinc in mouse models with damaged immune systems. Zinc could promote immune recovery in patients following stem-cell transplants for the blood cancer multiple myeloma.

T-cell development and thymic regeneration with the help of zinc

When mice are treated zinc, their thymuses shrink and produce significantly with mature T cells, even after three weeks on a no-zinc diet. This is to demonstrate that T cells cannot properly develop without zinc. He also discovered that zinc deficiency inhibits the recovery of T-cell count in mice after they had been exposed to immune-destroying treatments similar to those given to patients about to receive a blood stem cell transplant.

Extra zinc, on the other hand, accelerates this process, allowing T cells to recover faster than usual. A mouse model of blood stem cell transplant gave a similar result. So following zinc supplementation, we had a consistent result of a better reconstitution of the thymus as well as a better reconstitution of T cells in the peripheral blood.

The thymus' renewal was activated by a change in zinc levels around cells that release a key regenerative factor. T cells acquire zinc as they develop, but release it when they are killed by a damaging event, such as a burst of radiation.

GPR39 is a molecule that cells employ to sense changes in external zinc levels, and researchers found that an experimental component that stimulates GPR39 to mimics rising external zinc levels helps in promoting renewal factor release and thymic regeneration.

What we believe is that as zinc supplementation is given, it accumulates within the developing T cells. It gets stored and stored and stored, until the damage occurs and the zinc is released. Now you have more zinc than you would typically have, and it can prompt the regenerative process. We can target GPR39 directly with the experimental drug and get the same result without any pretreatment.

CONCLUSION

If zinc were to be added to the treatment regimens of transplant patients, it would be necessary to ensure that everyone getting it is actually zinc deficient. But there is currently no appropriate test to determine this.

GPR39-stimulating compounds will be pursued by researchers as therapies to promote thymic healing following acute damage such as pre-transplant radiotherapy. The researchers are currently testing similar chemicals to see whether any are more effective.

Researchers are also investigating if similar chemicals could aid thymic regeneration in other situations. Unfortunately, as we become older, our thymuses also slowly shrink and produce less T-cells. Researchers also want to know if enhancing the organ's regeneration processes will help slow down chronic degeneration.

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