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Distinct lymph node entry efficiencies for CD8+ and CD4+ T cells are eliminated during malnourishment.

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Glucocorticoids redirect naïve T cells to the bone marrow in malnourished mice

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Glucocorticoids contribute to the daily migration patterns of T cells in well-nourished organisms and are elevated in the malnourished. We examined the effect of malnutrition on T cell migration by comparing the migration patterns of adoptively transferred malnourished and control T cells in the lymphoid organs of malnourished and control recipients. We found that malnourished T cells generally entered lymphoid tissues more efficiently than control T cells, regardless of recipient. Strikingly, the bone marrow of malnourished recipients attracted naïve malnourished T cells, but not control T cells, more efficiently than control bone marrow. In contrast, the spleens of malnourished and control mice attracted similar numbers of naïve T cells. Further experiments revealed that T cells residing in the bone marrow of malnourished mice express higher levels of CCR7 and lower levels of CD11a than control T cells. We also examined the effect of T cell-specific deficiency of the glucocorticoid receptor on T cell migration to the bone marrow in malnourished mice. Indeed, similarly low percentages of glucocorticoid receptor deficient T cells were observed in the bone marrow of malnourished and control mice, indicating that T cell expression of the glucocorticoid receptor is required for T cell migration to the bone marrow. Overall, we have determined that malnutrition modifies both the bone marrow and naïve T cells to promote naïve T cell migration to the bone marrow and that at least the T cell-specific effects are mediated via the glucocorticoid receptor.