Direct and rapid induction of migration in human CD4+ T lymphocytes within three-dimensional collagen matrices mediated by signalling via CD3 and/or CD2.

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Specific activation of T cells requires stable cell-cell interaction; however, little is known how the transition from a previously motile state into a sessile state following activation is achieved. We investigated the direct effect of T-cell receptor (TCR)/CD3 complex engagement and/or stimulation of the accessory molecule CD2 on the locomotion of peripheral human T cells within three-dimensional (3-D) collagen lattices. Simultaneous engagement of CD3 and CD2 very potently stimulated T-cell migration, resulting in the recruitment of previously sessile cells (about 24% of the total population was additionally recruited) as well as an increase in the mean duration of active locomotion. This induction of migration was accompanied by an increased tyrosine phosphorylation of a 125 000 MW substrate corresponding to the focal adhesion kinase. Using confocal laser scanning microscopy we detected antibody-induced receptor capping into the uropod of migrating T cells whereas untreated control cells displayed an even distribution of CD3 and CD2 on the cell surface. Less pronounced induction of locomotion was achieved following triggering of CD3 or CD2 alone. Thus, in 3-D collagen lattices specific T-cell activation did not lead to cessation of cellular migration but rather induced cytoskeletal activity that ultimately resulted in vigorous locomotory activity.

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