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DIFFERENTIATION OF BEWO CHORIOCARCIONA CELLS MAY BE CORRELATED INVERSELY WITH STIFFNESS OF THE CYTOSKELETON

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The expression of differentiation markers, in particular chorionic gonadotropin (hCG), by BeWo-choriocarcinoma cells has previously been shown to depend on cell shape which can be modulated by matrix gels, or with p-HEMA (polyhydroxethyl-methacrylate). In the present series of experiments, the presumed role of the cytoskeleton in this response was investigated by applying mechanical stress to the cell surface via 4.5 µm ferromagnetic beads coated with an RGD-peptide. Defined forces were exerted using a magnetic twisting device. Cells were grown on plastic or plastic coated with increasing concentrations of p-HEMA. After seeding of cells, cytoskeletal stiffness increased and reached the maximum after 24 hours on all substrates. Cells on plastic appeared flat and their cytoskeleton displayed high stiffness (8.2 ± 0.9 Pa at a stress of 3.3 ± 0.2 Pa applied to the beads). On substrates coated with high concentrations of p-HEMA (0.1 mg/cm^2) cells formed aggregates of rounded cells; here stiffness of the cytoskeleton was reduced (5.8 ± 0.6 Pa). Stiffness of the cells depended on the actin cytoskeleton as shown by incubation with cytochalasin-D. Nocodazole and colchicine (microtubules), or acrylamide (intermediate filaments) had no effect on BeWo-cell stiffness. These data suggest that the actin cytoskeleton may play a special role in the correlated control of cell shape and differentiation by outside-in signaling through exatracellular matrix, in BeWo cells.