

The agarose assay: It's utility in cell migration and invasion

Maitham A. Khajah

Kuwait University, Kuwait

Abstract

Cell migration, invasion and chemotaxis are typically involved in diverse processes from embryonic development and differentiation to angiogenesis, immune response, wound healing and cancer cell metastasis. Commercial invasion assays are largely based on the Boyden chamber principle, requiring cells to penetrate through a simulated ECM, most commonly matrigel (a meshwork of proteins including proteoglycans, collagen and laminin, growth factors and enzymes). The ease of use and high throughput capacity of these plate based assays utilizing transwell inserts is countered by relatively high cost as well as limitations on experimental manipulations. As a low cost and more versatile alternative we have successfully used agarose as an alternative matrix in either a 'spot' or 'under agarose' assay. The former is a quick easy way to qualitatively assess invasion, whilst the latter affords opportunity for quantification and examination of several conditions simultaneously, to determine random as well as chemotactic invasion and also to perform competition experiments between different factors. For the spot assay, 10 μ l aliquots of 0.5% molten agarose are pipetted into a culture dish/plate. After solidification, medium containing test cells is added and penetration periodically monitored microscopically. For under agarose, 1-3 wells (3.5mm diameter) are created in an agarose layer in 6 well plates using a metallic mould. Cells and /or soluble factors (chemoattractants, growth factors, inhibitors etc) are pipetted into the same or different wells. Penetrant cells migrating in different directions are counted using a microscope. Data will be presented for both immune cell chemotaxis and cancer cell migration applications.

Biography

Maitham Khajah has completed his B. Pharm degree from Faculty of Pharmacy, Kuwait University in 2003 and obtained his Ph.D degree (through a scholarship from Kuwait University) in December, 2009 from the University of Calgary, Canada (Gastrointestinal science & immunology). He is currently an Assistant Professor in Kuwait University, Faculty of Pharmacy, Department of Pharmacology & Therapeutics since January 2010. His research interest is to study new molecular targets for the treatment of inflammatory bowel disease (IBD), and the mechanisms responsible for immune cell chemotaxis. He is also interested in studying the mechanism of cancer cell invasion and metastasis specifically by using various endocrine resistant breast cancer cell lines.