

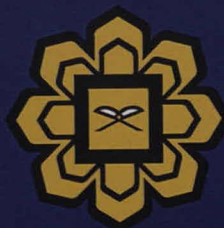
**EXPERIMENTAL METHODS
IN MODERN BIOTECHNOLOGY**

Editors

Ibrahim Ali Noorbacha

Mohamed Ismail Abdul Karim

Hamzah Mohd Salleh

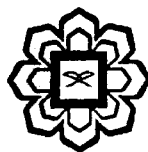


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Ibrahim Ali Noorbatcha
Mohamed Ismail Abdul Karim
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***In Vitro* Assay for Investigating Potential Anti-Cancer Agents Targeting At Metastatic Level**

Yumi Zuhanis Has-Yun Hashim and Chris I.R. Gill

1. Introduction

Metastasis is the most devastating stage of carcinogenesis where spreads of secondary tumours to distant sites often result in mortality. A three-step hypothesis has been proposed to describe invasion of tumour cells (i) adhesion of tumour cells to basement membrane of extracellular matrices, (ii) protease activity that induce and or enhance local degradation of the matrix and (iii) migration of tumour cells through the modified matrix (MacDonald *et al.* 1993 and Liotta *et al.* 1983). At *in vitro* level, potential anti-cancer agents targeting at metastatic level can be studied using Matrigel invasion assay. The Matrigel invasion chambers used in the assay consist of inserts containing an 8 micron pore size polyethylene membrane that has been treated with Matrigel Basement Membrane matrix. The layer of Matrigel matrix served as a reconstituted membrane *in vitro*. This uniform layer occludes the pores of the membrane blocking non-invasive cells from migrating through the membrane. By contrast, invasive cells are able to detach themselves from the matrix and migrate through the Matrigel-matrix treated membrane. Chemoattractants are used to induce invasion through the membrane. Using this assay, a potential anti-metastatic agent can be tested by calculating the percent of inhibition of cell invasion through the matrix as compared to control. The assay is based on Parr *et al.* 2000 with some modification. Other similar techniques to investigate metastatic potential of compounds of interest include scratch wound assay, migration assay (Liang *et al.* 2007 and Yarrow *et al.* 2004) and adhesion assay (Hashim *et al.* 2008). However, these assays lack of extracellular matrix (basement membrane) interface which plays a vital role in the metastatic process. As such, the Matrigel-based invasion assay discussed in this chapter offers the advantage of real environment for cell invasion and metastasis that may lead to meaningful results.

2. Scope

This chapter is intended to introduce readers to an *in vitro* assay that is useful for screening of metastatic properties of compounds of interest.