Modelling Solid Tumour Growth

Introduction

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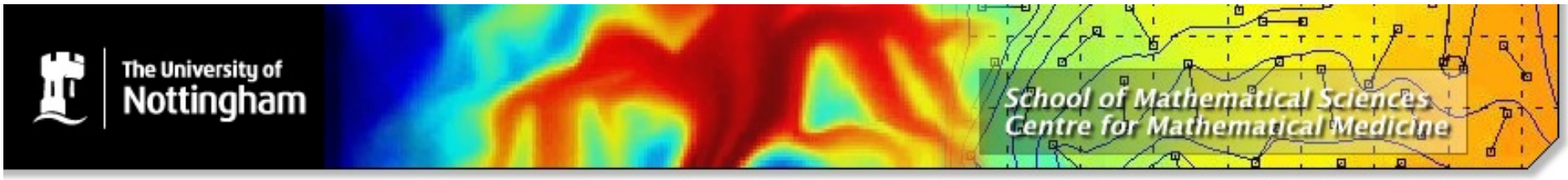

Some Preliminaries

- Course Aims
- Course Structure
- Background Tumour Biology

Course Aims

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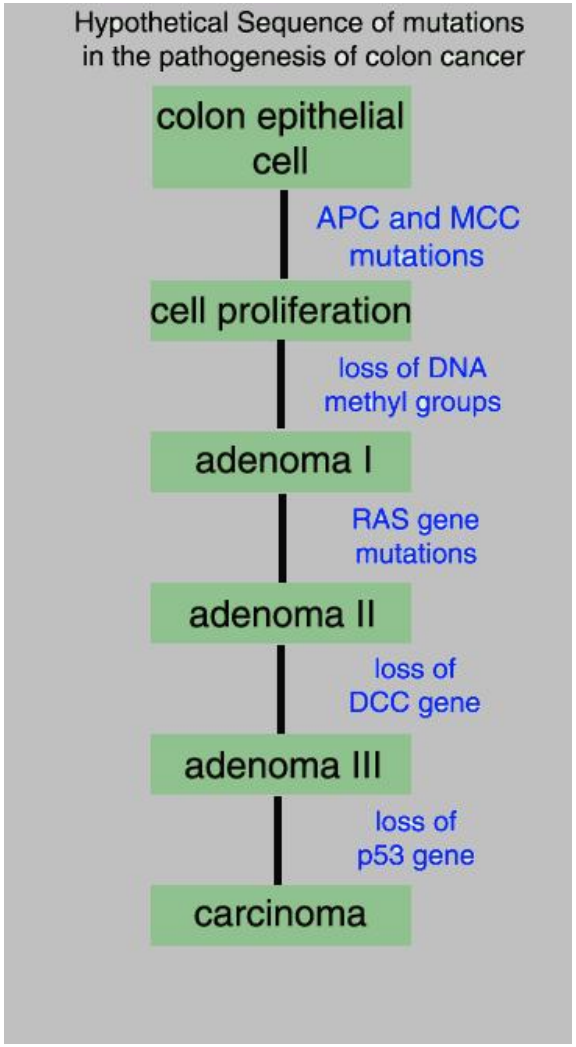
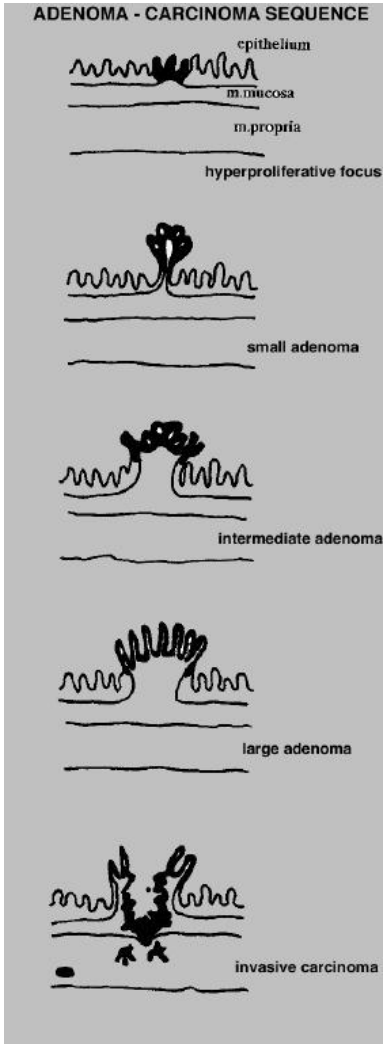
- Working knowledge of tumour biology and related mathematical research
- Appreciation of current and emerging research directions
- Experience of, and familiarity with, mathematical modelling

Lecture Plan

- Spatially-averaged models of avascular and vascular tumour growth (ODE models)
- 1D, spatially-structured models of avascular tumour growth (moving boundary problems)
- Tumour invasion and symmetry breaking (linear stability)
- Angiogenesis models (discrete vs continuous)
- Summary and future directions (vascular tumour growth; emerging therapies)

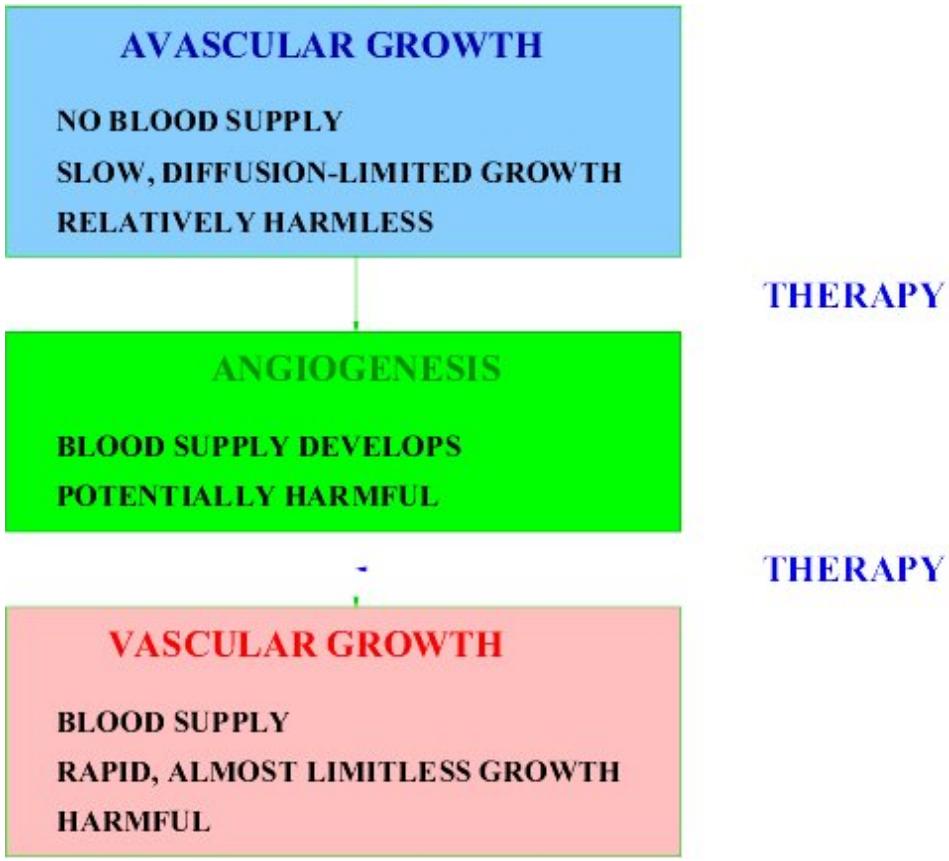
Tumour Progression





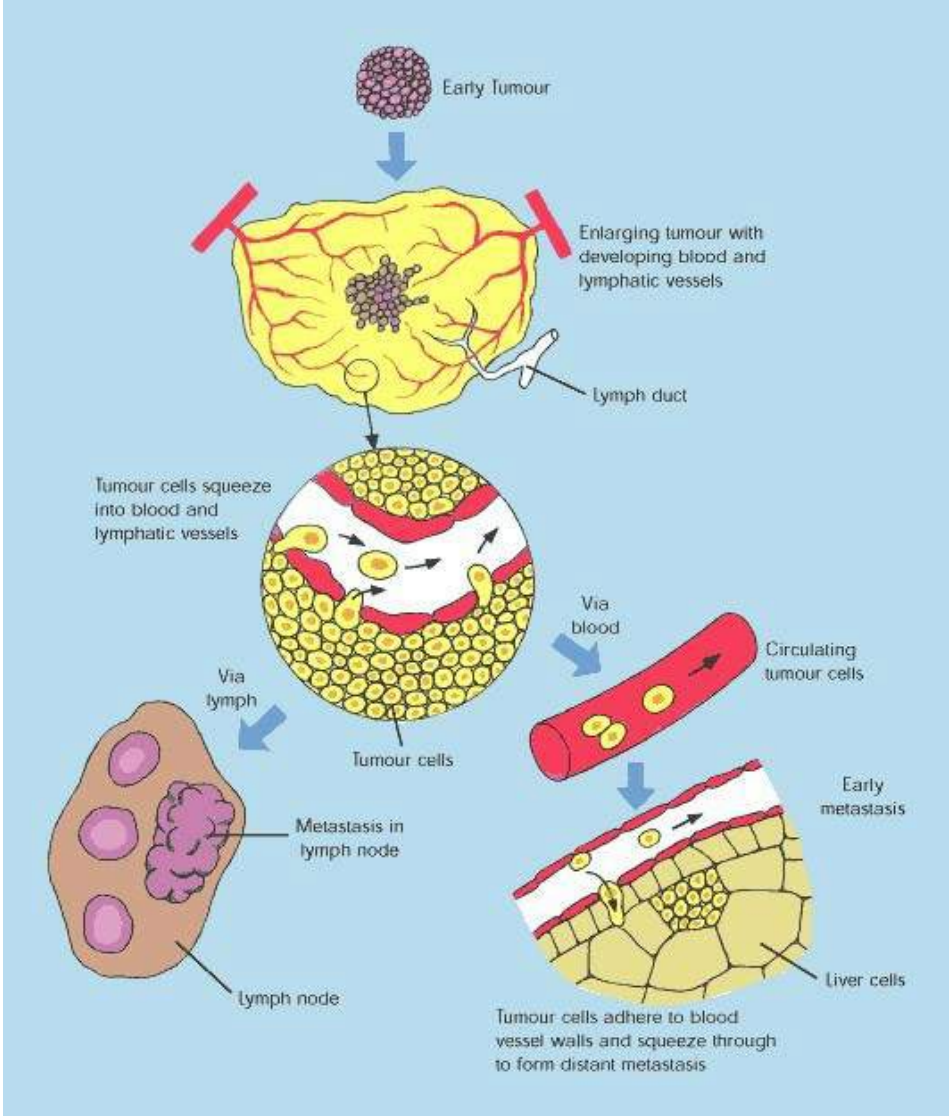
The Genetic vs the Macroscopic Perspective

Tumour Progression

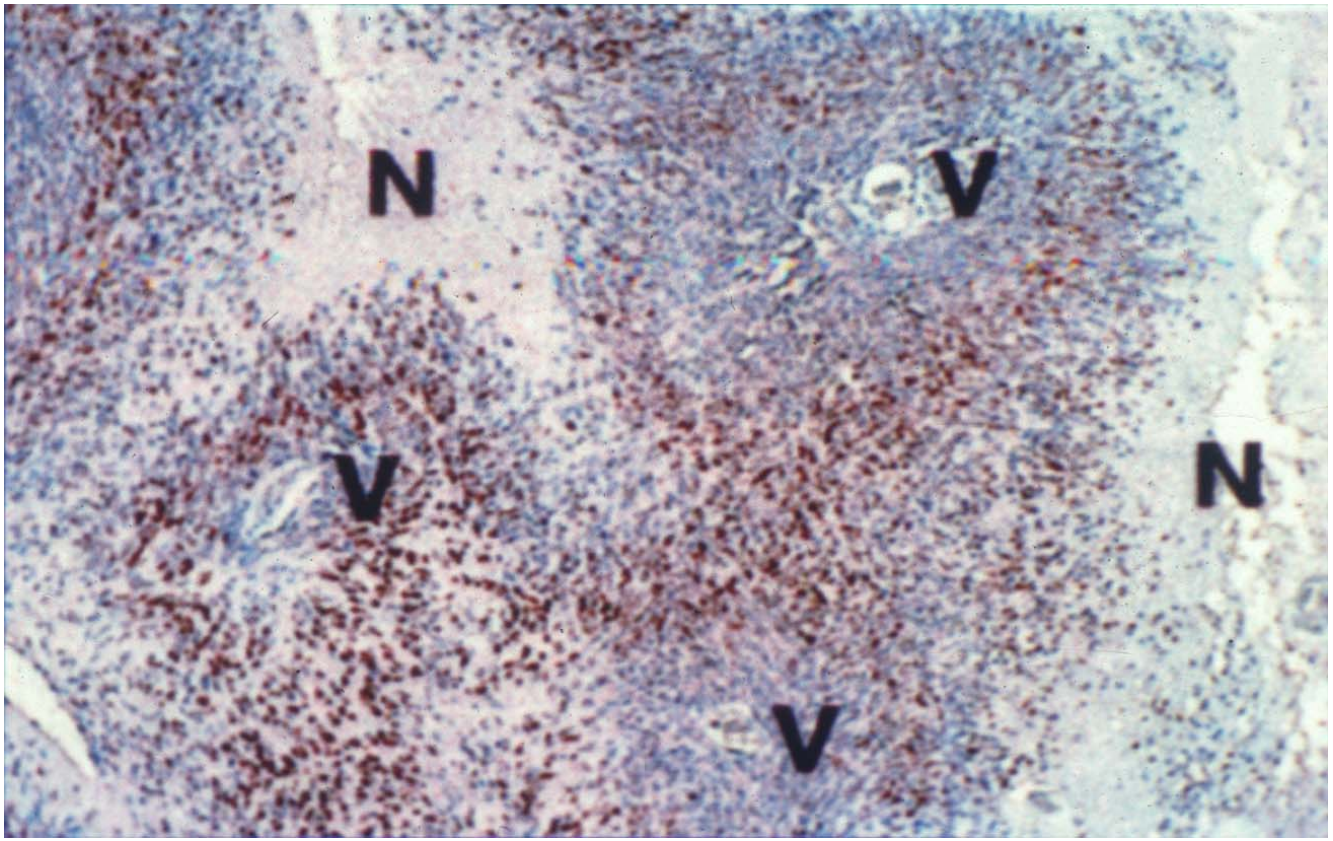


The Sanitised, Theoretical Perspective

Tumour Angiogenesis, Invasion and Metastases

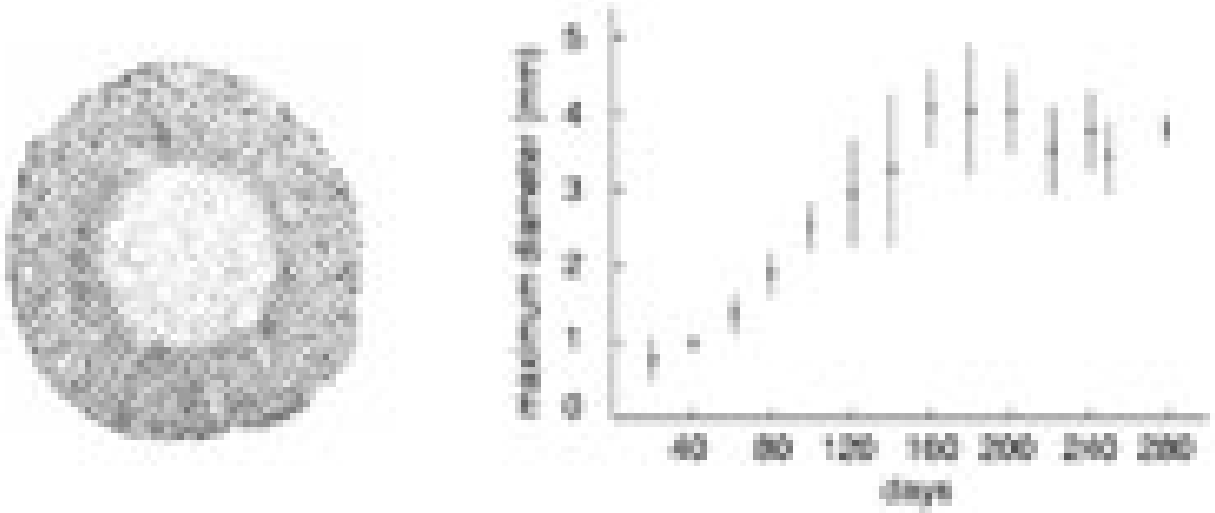


Background: Spatially-Averaged Growth



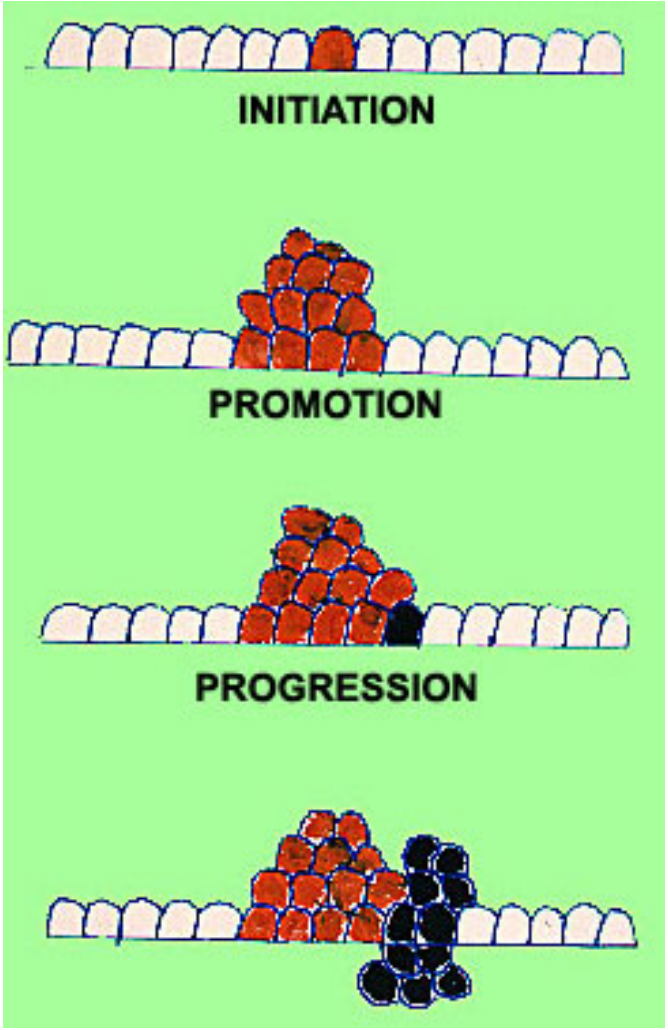
Cross section through vascularised tumour (lecture 1)

Background: Avascular Tumour Growth



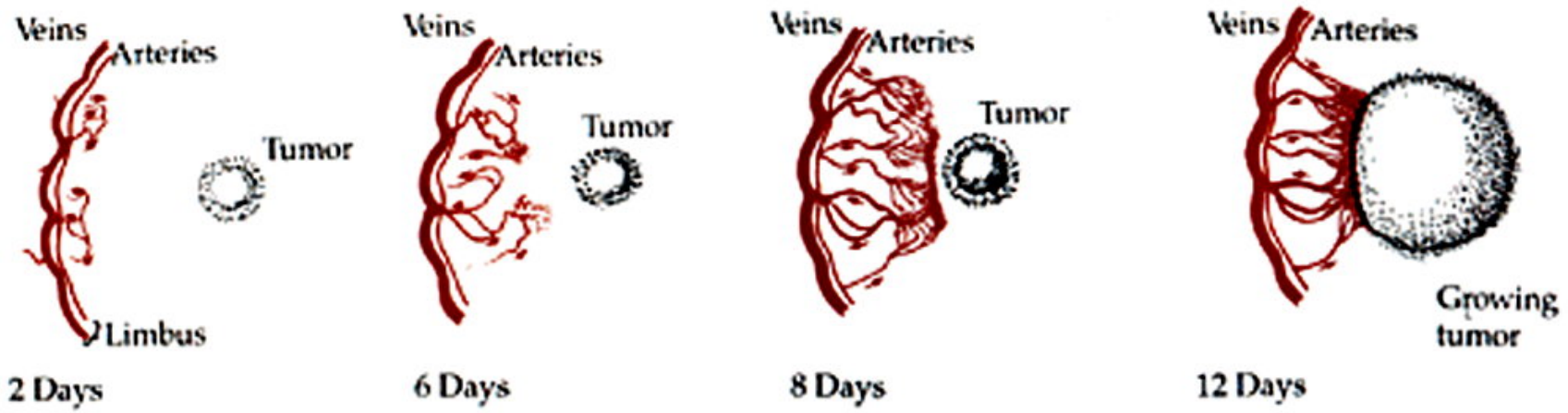
Well-developed avascular tumour (lecture 2)

Background: Tumour Heterogeneity and Invasion



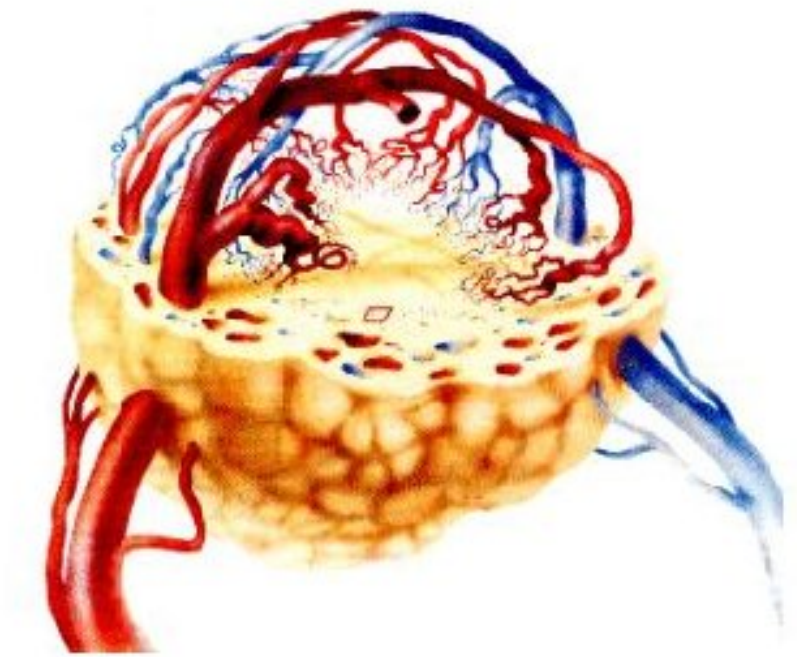
Schematic diagram illustrating tumour heterogeneity and invasion (lecture 3)

Background: Tumour Angiogenesis



Schematic diagram of tumour angiogenesis (lecture 4)

Background: Vascular Tumour Growth



Schematic diagram of a vascular tumour (lecture 5)