

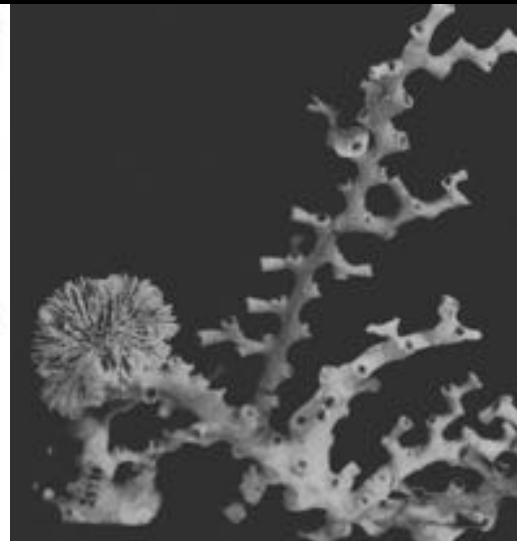
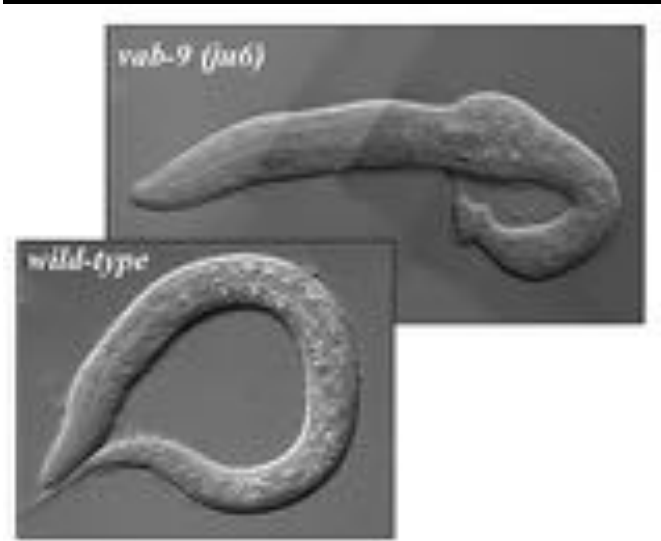


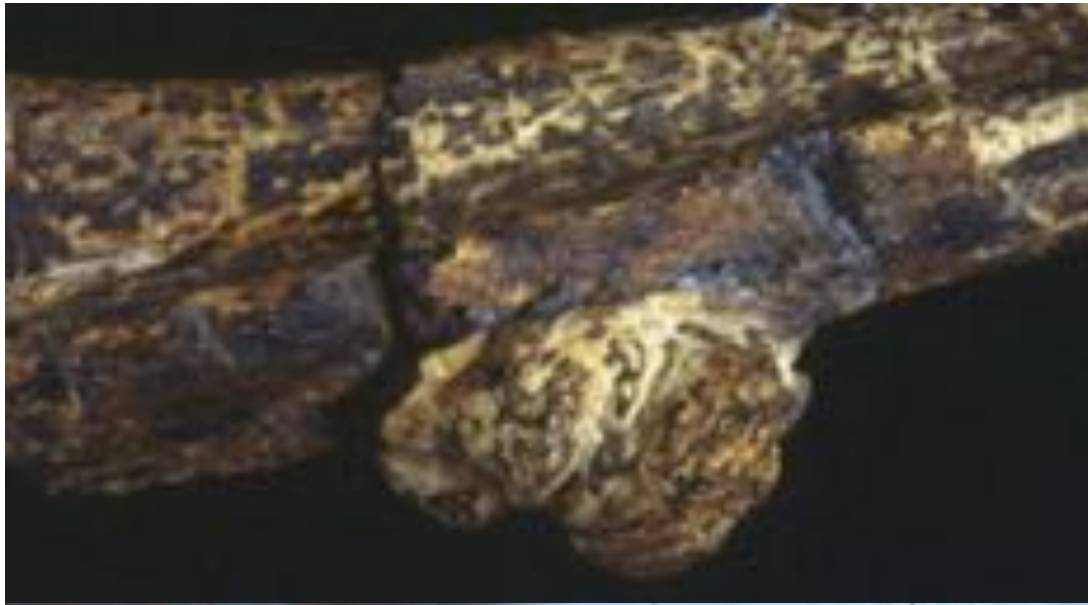
Otago Spotlight Series
Cancer Research

Cancer

Parry Guilford
Cancer Genetics Laboratory

- A primitive, fundamental disease





**Scythian king (Siberia)
700BC**



Prostate cancer

**Ferdinand I
King of Naples, died 1494**



Colorectal cancer

Exon 12 KRAS mutation



1550AD. Michael Angelo 'Night'



What causes it?



Natural Selection

- 20,000 genes/cell
- 20,000 functions

Strict restrictions on when and where these genes are active



Genetic damage can activate these genes



Natural selection

Cells with a survival/growth advantage outgrow neighbouring cells

Cancer



Natural selection

Enhanced cell division,
survival and migration



Environment

Diet, exercise, viruses,
radiation, carcinogens

Bad luck

Background
Mutation rate

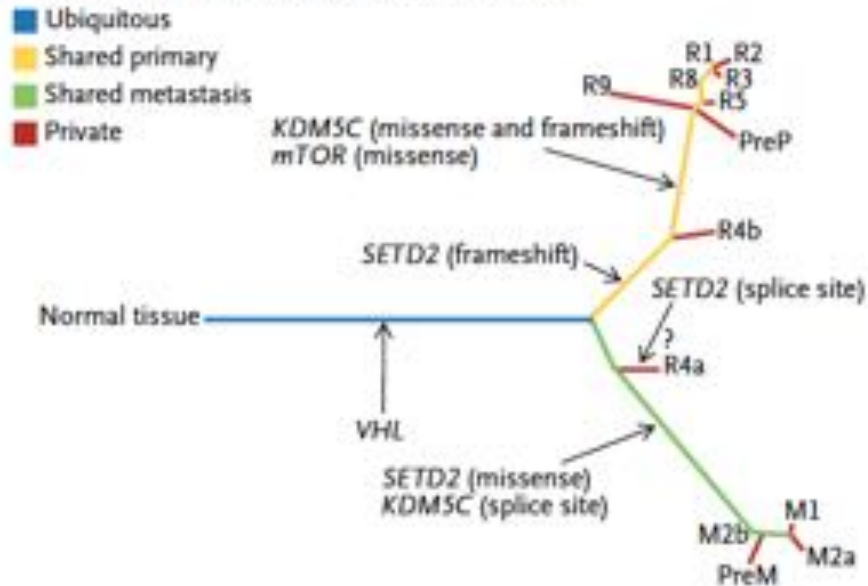
Inheritance



Repaired,
inconsequential
or deleterious

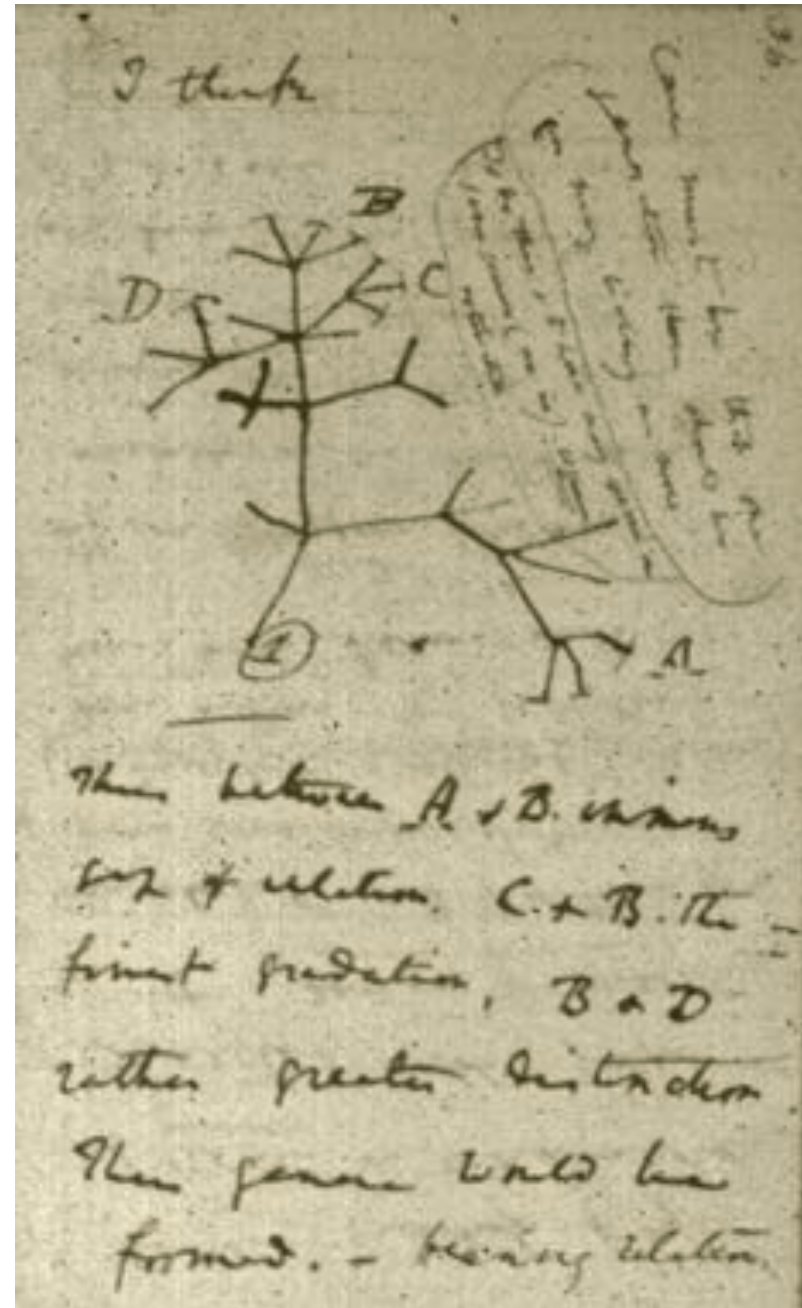
Continued Tumour Evolution

C Phylogenetic Relationships of Tumor Regions



Gerlinger et al (2012) NEJM 366, 883-892

Darwin's Tree of Life

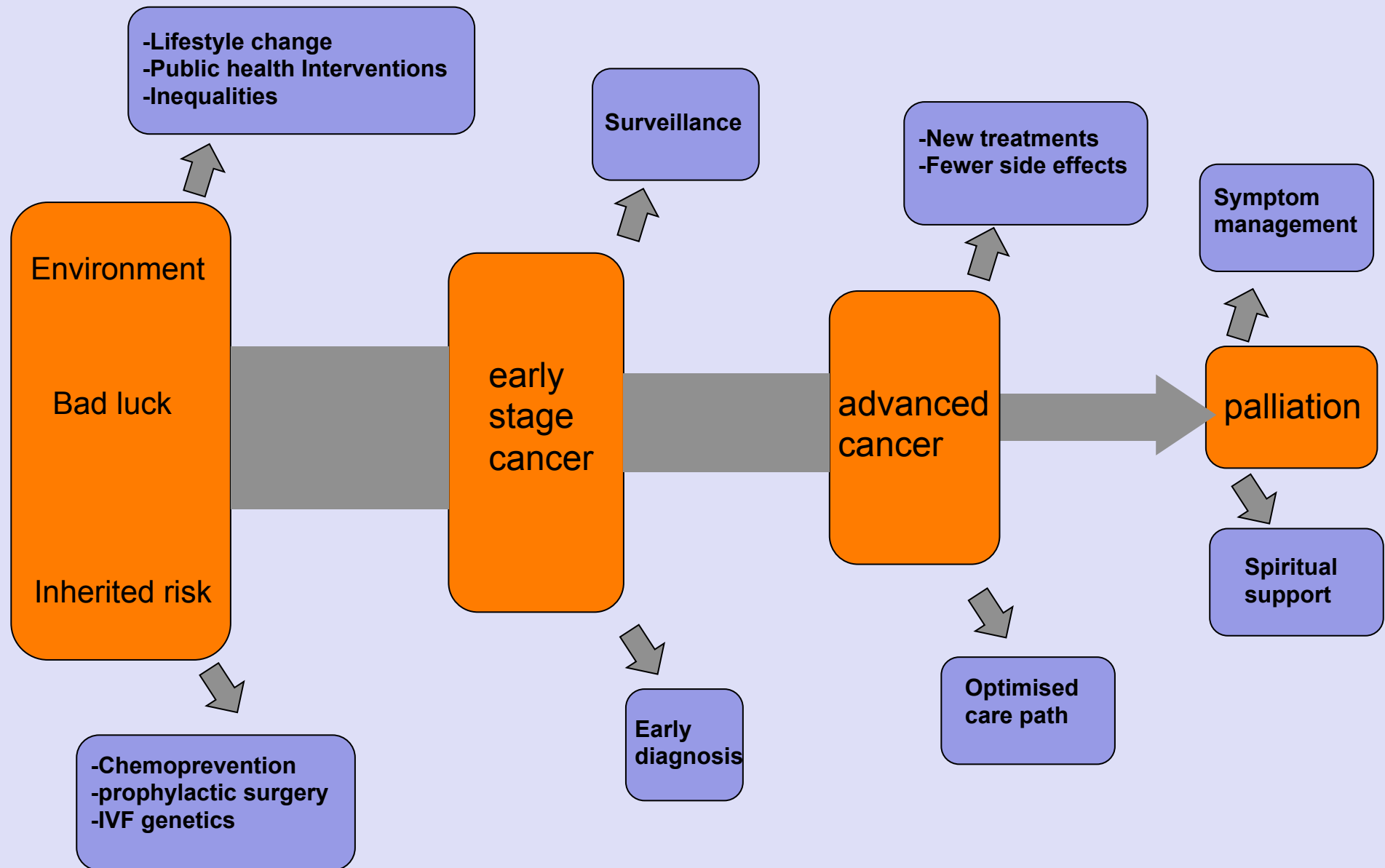




- Fundamental disease
- Driven by evolutionary power
- Unavoidable baseline rate
- No panacea

What can we do?

Reduce the burden wherever the opportunity arises





Requires
Research



Why do cancer research in NZ?

- NZ-specific problems
(cancer incidence, inequalities and economics)
 - Accelerate integration of international research
 - Improve the standard of clinical care
 - Reduce the cost
 - Take responsibility for our own fate
 - Train the next generation
 - Contribute to international effort
-
- Independent thinkers



Cancer Research at Otago

ASPIRE2025 (tobacco research group)

Biostatistical consulting

The Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme

Cancer biology, Department of Pathology

Cancer Control and Screening Research Group

Cancer Society Social and Behavioural Research Unit

The Canterbury Comprehensive Cancer Centre

Centre for Bioengineering and Nanomedicine

Centre for Free Radical Research

Centre for Society, Governance & Science

Centre for Translational Cancer Research

Clinical Genetics Group

Colorectal Translational Research Group

EXPINKT™ exercise in recovery

Haematology Research Group

Health Inequalities Research Programme

Helicobacter Research Group

Hugh Adam Cancer Epidemiology Unit

Lymphoedema treatment

Mackenzie Cancer Research Group

Oncology Research Group

Oral molecular and immunopathology

Pathology and molecular medicine

Pharmacology and toxicology

Pharmacy

Protein biochemistry, structural biology and apoptosis

Radiation therapy

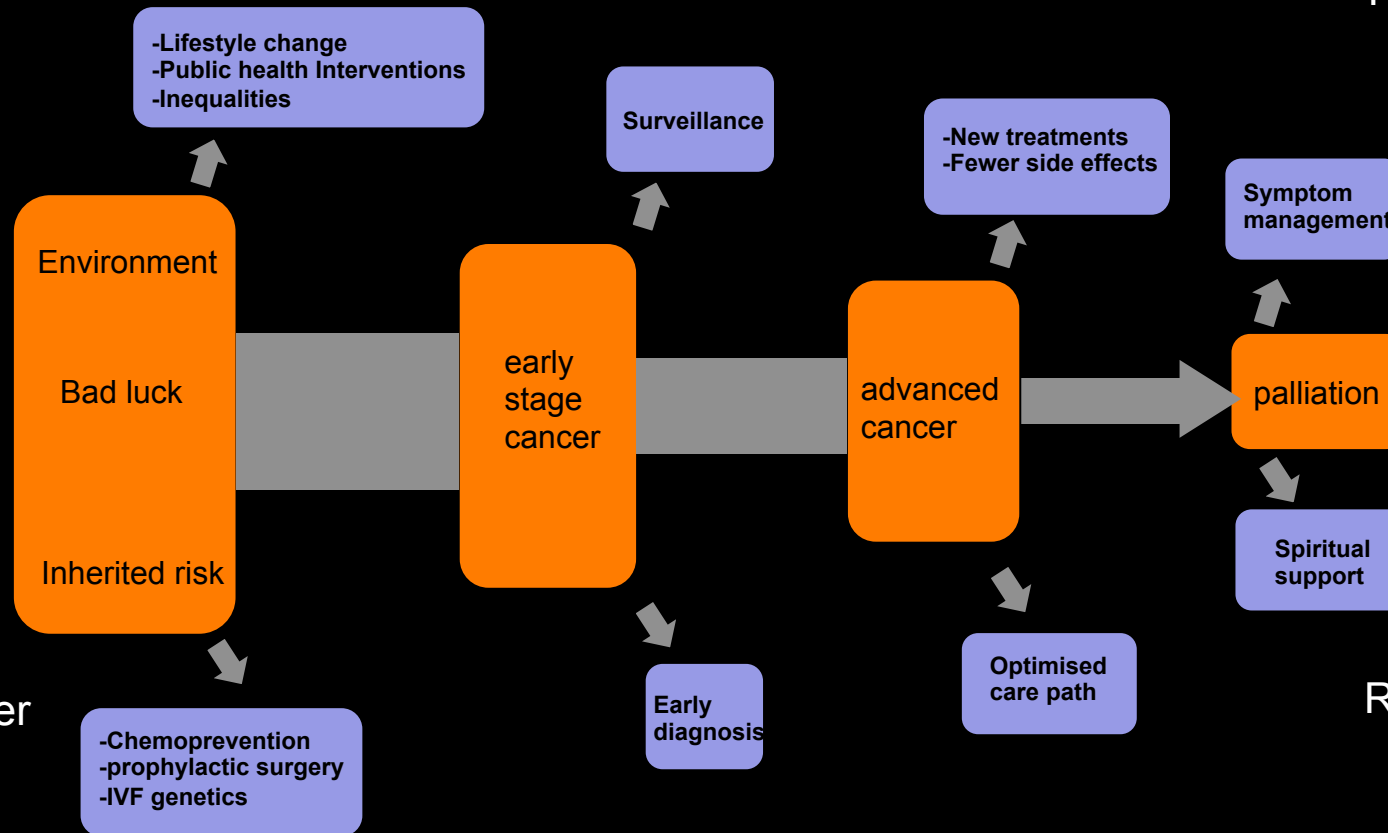
Research commercialisation and innovation

Structural biology of cellular signalling

Jason Gurney Sarah Young Heather Cunliffe Khaled Greish

Rose Richards

Patrics Herst



Logan Walker

Richard Egan

Parry Guilford

Antony Braithwaite

Chris Jackson

Di Sarfati

Nisha Nair

Tony Blakely