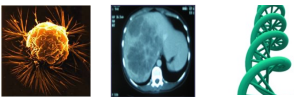


CANCER REHABILITATION

About Cancer

Page 8




Professor Robert Thomas
Consultant Oncologist
Addenbrooke's, Bedford Cambridge University NHS Trusts
Cranfield University

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What is cancer?



- **Cancer** (Malignant growth)
 - Invade adjacent structures
 - Spread to distant organs
- **Benign** (Lumps, tumours, growths)
 - Press onto adjacent structures
 - Do not spread

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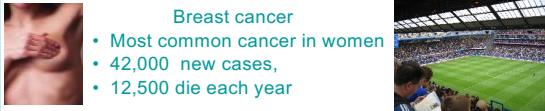
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The Cancer problem

- 1 in 3 lifetime risk
- 1 in 4 die of cancer
- >1.8 million survivors in the UK
- 11 million in the USA

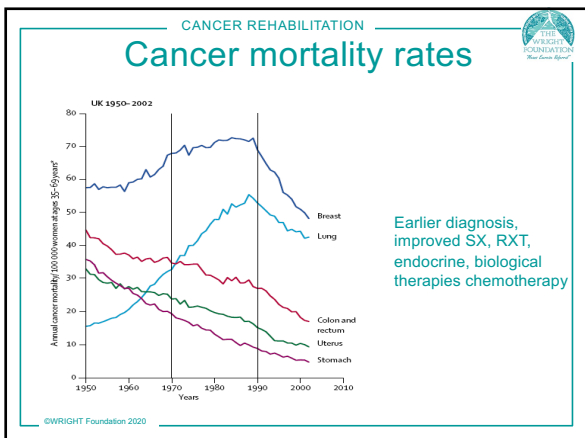
Breast cancer

- Most common cancer in women
- 42,000 new cases,
- 12,500 die each year



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How does cancer start?

Cancer genes already located in the DNA

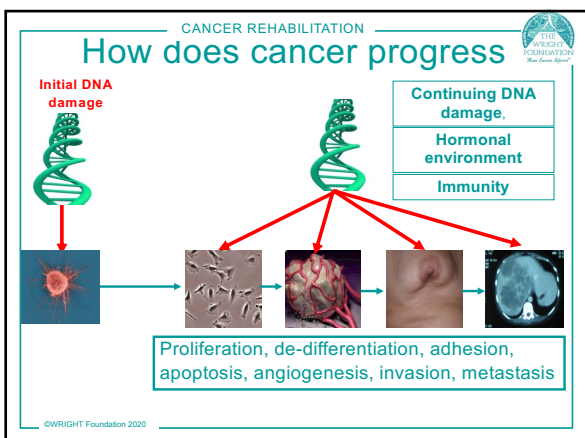
Locked in place by suppressor genes

DNA damage

- Mutate genes
- Move the cancer genes to locations
- Start the cancer process

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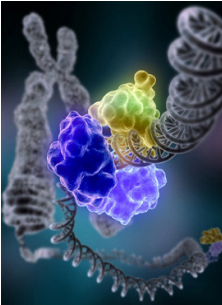


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Increased cancer risk
Underlying genetic susceptibility

- **General**
 - Age
 - Family history
- **Born with mutations**
 - Familial adenomatous polyps
 - Peutz-Jeghers syndrome
 - Cereb1 or 2
 - Browns disease






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Increased cancer risk
Medical conditions

- Inflammatory bowel disease
- Previous radiotherapy
- Previous chemotherapy
- Colorectal polyps
- Chronic ulcers
- Diabetes
- Viruses (e.g HIV & Epstein Barr)
- Parasites







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Increased cancer risk
Lifestyle factors

- **Obesity**
- **Sun burning**
- **Environmental carcinogen exposure**
- **Asbestos**
- **Sedentary lifestyle**
- **Smoking**
- **Alcohol**
- **Poor diet:**
 - high in animal fats, low in dietary fibre
 - low intake of fresh fruit & vegetables
 - High dietary carcinogens low antioxidants



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WCRF Recommendations for Cancer Prevention

“Nearly Half Of Breast Cancer Cases Could Be Prevented By Healthy Lifestyles”

- Being as lean as possible but not underweight
- Keeping fit – exercising
- Stop smoking
- Gentle regular sun exposure
- Limiting consumption of fatty, salty and sugary foods
- Eating fruit, vegetables and pulses;
- Eating less red meat and processed meat
- Drinking less alcohol.

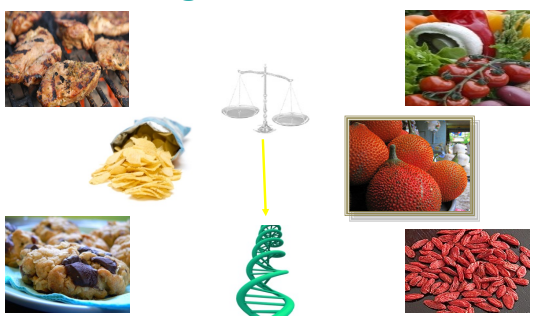


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Carcinogen : antioxidant



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Common carcinogens

- Acrylamides - high temperature cooking
- N-nitroso compounds - red particularly bloody meat
- Hydroperoxide, alkoxy and epoxides - heated protein, pasteurized milk
- Polycyclic or aromatic hydrocarbons - smoked, burnt, grilled barbequed food
- Allylaldehide (acrolein), butyric acid and other nitrosamines - heated fats
- Nitropryrene, benzpyrene and nitrobenzene - heated oils
- Methylglyoxal and chlorogenic atractyosides - in over roasted coffee
- Pesticides, fertilizers, herbicides - in water & crops
- Benzene, formaldehyde, ammonia, acetone - smoke
- Hydrogen cyanide, and arsenic - smoke

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Usually greater than 1000 ug/kg
 Burnt barbequed meat
 Veggie chips, potato snacks or potato crisps
 Dry roasted oat or wheat bran crackers


Usually between 500-1000 ug/kg
 French fries
 Processed baked potatoes or hash browns
 Ginger snap cookies, pretzel, sesame snacks, Tortillas, potato snacks
 Dried soup mix

Usually between 200-500 ug/kg
 Butter flavoured popcorn
 Fried potato skins, corn flaked cereals or corn chips
 Cream crackers, Processed prune juice
 Toast

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The Oxygen Radical absorbance Capacity (ORAC)

Tibetan goji berry	25,300 (3,000)	Enzymatic defence against oxygen reduction metabolites
Prunes	5,770	
Raisins	2,830	Enzymatic defence against oxygen reduction metabolites
Blueberries	2,400	
Alfalfa sprouts	930	<ul style="list-style-type: none"> • Superoxide dismutase (SOD) (Manganese, copper and zinc) • Glutathione peroxidase (selenium) • Catalase
Broccoli florets	890	
White onion	860	
Beets	840	
Tomato	770	
Cherries	670	
Carrots	650	
Peas	360	Wilkinson S, 2003, Marklund SL



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How do cancers present

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How do cancers present

Symptoms

- Blood**
 - Sputum,
 - Urine
 - Stool
 - Abnormal vaginal bleeding
 - Fatigue
- Pain**
- Change in bowel habit**



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How do cancers present

Lumps or distortion

- Discrete lump**
- Swelling**
 - lymphodema
- Fungation or ulceration**



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How do cancers present

Screen detected

- Mammogram**
- Stool sample**
 - faecal occult blood
- Blood test**
 - PSA, white cell count



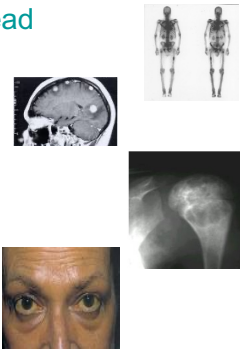
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How do cancer present Metastatic spread

- Pain
 - Bony
 - Liver
 - Headaches
- Fracture
- Confusion / seizures
- Lumps
- Immobility

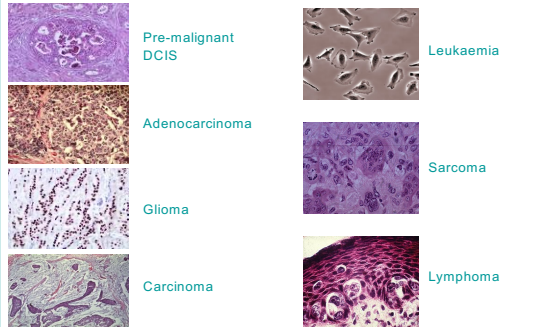


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Types of Cancer



- Pre-malignant DCIS
- Adenocarcinoma
- Glioma
- Carcinoma
- Leukaemia
- Sarcoma
- Lymphoma

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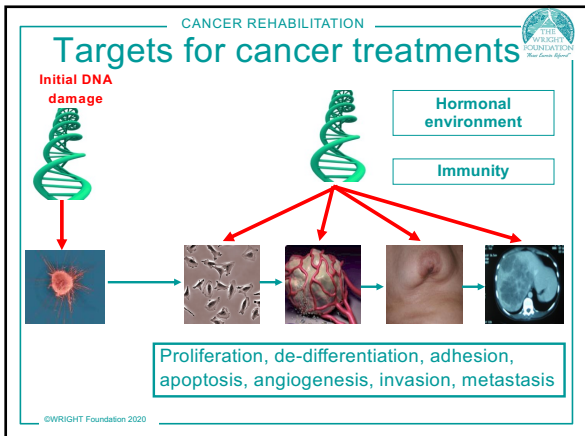
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Our bodies defences against cancer

- The enzymatic defences
- DNA repair proteins
- The DNA policeman
- The immune system

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Treatments

Surgery	- 90%
Radiotherapy	- 80%
Chemotherapy	- 40%
Hormones	- 70%
Biological therapies	- 10%

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- CANCER REHABILITATION
- ### Surgery
-
- Lumpectomy
 - Mastectomy
 - Axillary sample
 - Sentinel Node
 - Axillary clearance
 - Colectomy
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Radiotherapy






- Neo-adjuvant
- Radical
- IMRT / Tomotherapy
- Partial volume
- Boost
- Timing with chemotherapy

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Chemotherapy



- Anthracyclines
 - Epirubicin
 - Adriamycin
- Taxanes
 - Taxotere
 - Taxol
- Cyclophosphamide
- Fluorouracil
- Methotrexate
- Platinum
- Vinorelbine
- Gemcitabine

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Hormone therapy



George Beatson 1896

Suppression of endogenous oestrogen production

- Induction of menopause (surgery, RT, medical)
- Aromatase inhibitors (letrozole, anastrozole, exemestane)
- Progestogens

Interaction with ER

- Competition with estrogen (SERMs e.g. tamoxifen, Toremifene)
- Destruction of the receptor (SERDs e.g. fulvestrant)


SERM: selective estrogen receptor modulator
SERD: selective estrogen receptor downregulators

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Biological agents



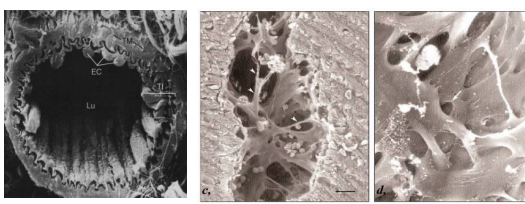
- Tyrosine Kinase inhibitors (EGFR)
- Anti-angiogenesis

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Anti - angiogenesis

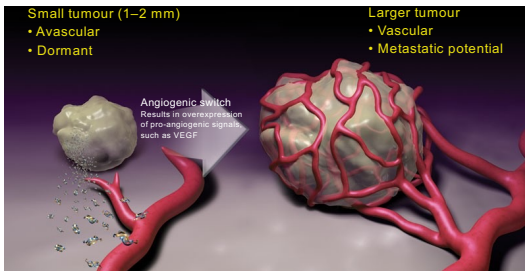


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VEGF and other signals promote the angiogenic switch in tumours



Small tumour (1–2 mm)

- Avascular
- Dormant

Angiogenic switch
Results in overexpression of pro-angiogenic signals such as VEGF


Larger tumour

- Vascular
- Metastatic potential



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Further information



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