

Herbal Medicine

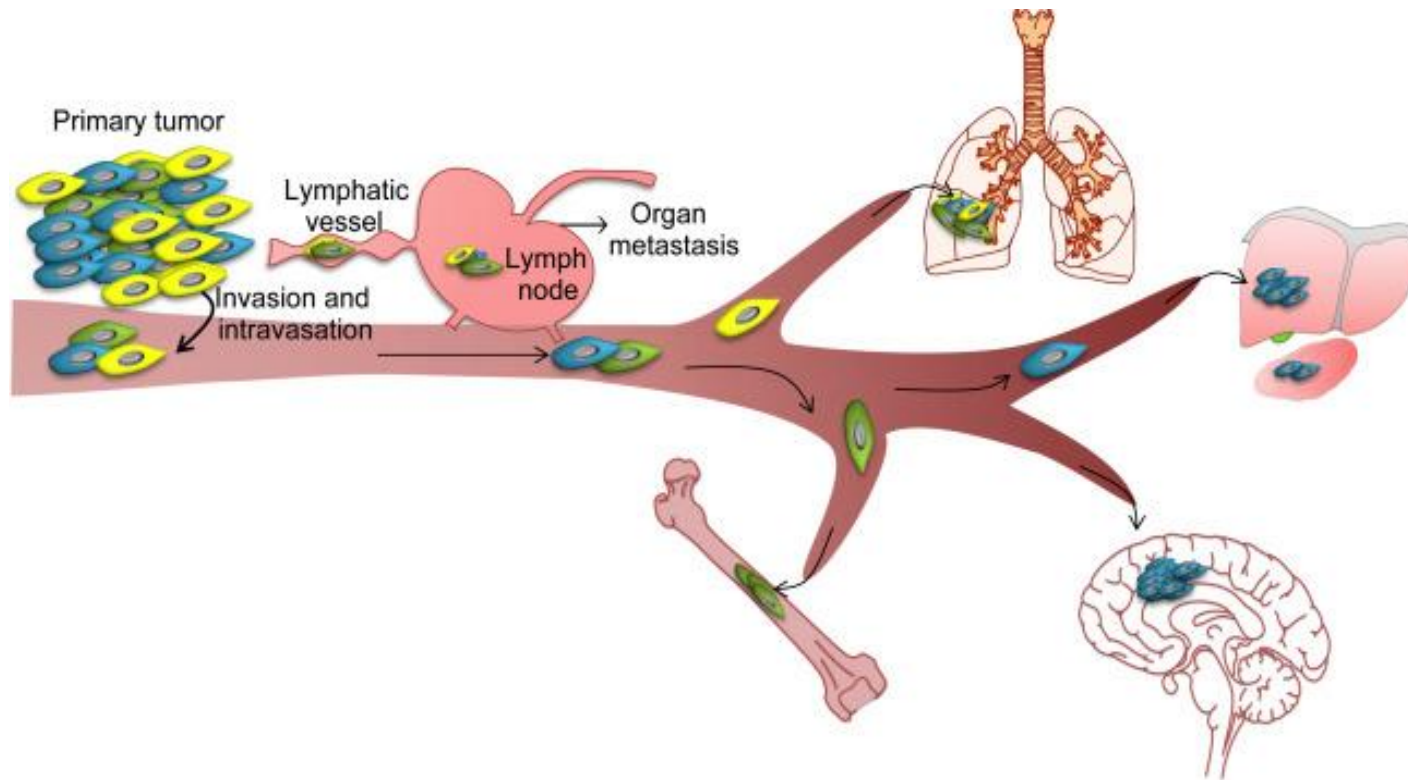
Oncology

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Herbal Medicine lecture series

- Term 1:
- 1 Introduction
- 2 Cardio-vascular system
- 3 Metabolic and Endocrine
- 4 Gastro-enterology
- 5 Obstetrics/Gynaecology
- 6 Neuropsychiatry
- 7 Oncology
- 8 Infectious diseases
- Term 2:
- 9 Respiratory disease
- 10 Rheumatology
- 11 Kidney/ bladder disease
- 12 Dermatology
- 13 Adverse effects
- 14 what really works

Cancer -uncontrolled cell division allowing local and distant spread via the lymphatics and blood stream. Usually age related - telomeres

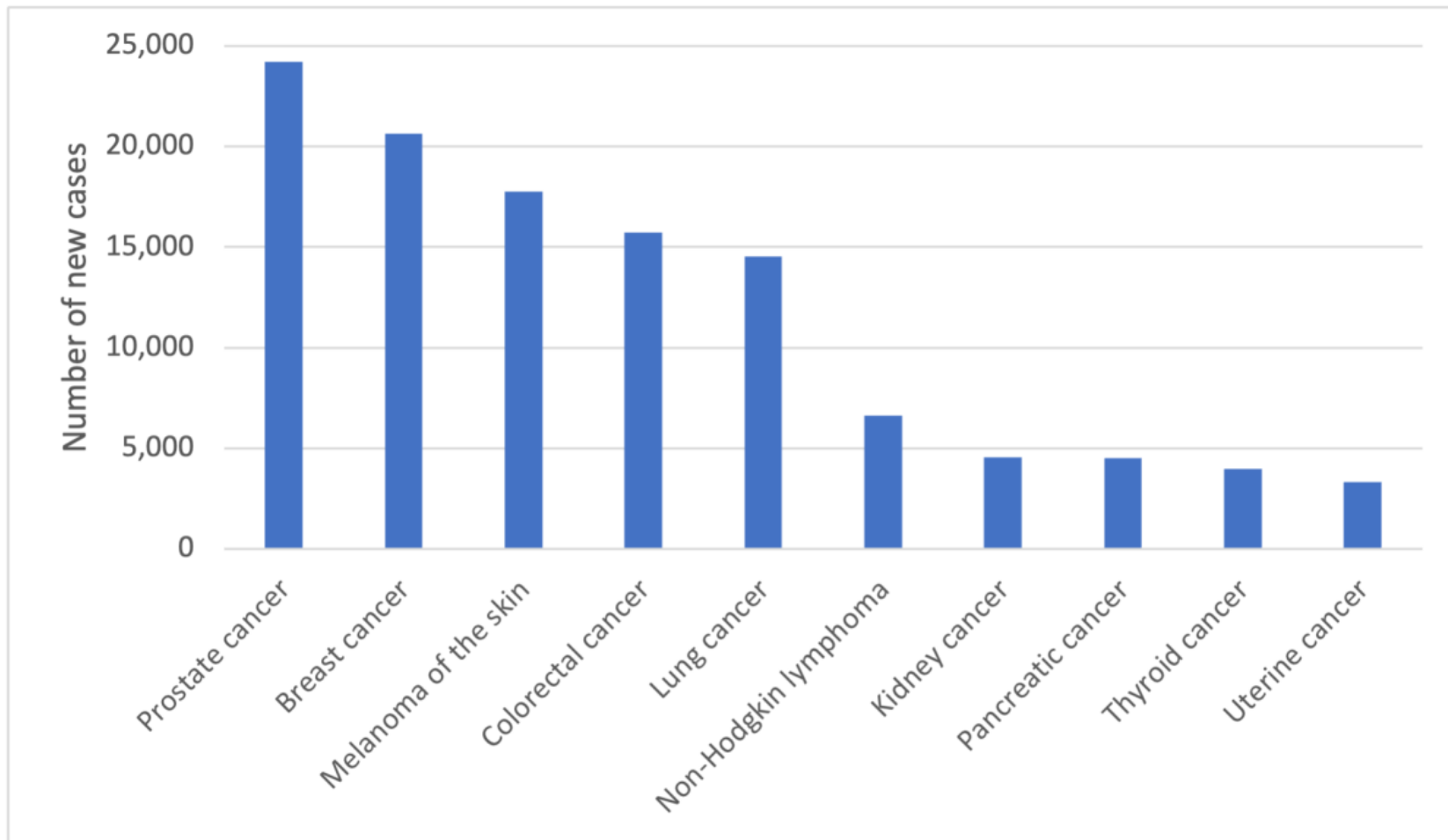


Cancer –historical treatment. Little past recognition as rare in young and life expectancy short

- Bone cancer found in pre-historic bones 1.7 million years old
- Breast Ca recorded on papyrus for Egypt 1600 BC
- 400BC Hippocrates gave name karkinos (Greek for crab)
- Pre-Medieval times treated with spells and exotic applications
- 19th Century, start of surgery
- Early 20th century, start of radiotherapy
- Pre 1950 only options were surgery and radiotherapy
- Late 20th Century, chemotherapy, radioactive isotopes
- 21st Century genomic testing – the future

Australia discriminatory cancer statistics

- 2022 new cases – 160,000, 90,000 males, 70,000 females
- 2022 deaths - 50,000, 30,000 males, 20,000 females



Cancer with ageing

- Estimated 5 cancer cells develop each day, immune system destroys
- 1 percent of cancer cases are diagnosed in people under age 20. 2.7 percent of cases are diagnosed in between ages 20-34. 4.8 percent of cases are diagnosed in between ages 35-44. 11.3 percent of cases are diagnosed in between ages 45-54.
- ie 80% are older than 55
- 28% over 75, DNA wears out (Telomeres)
- Some cancers are environmental:
- Benzene, asbestos, vinyl chloride, radon, arsenic, asbestos, trichloroethylene, silica, arsenic etc
- Prognosis better than before, but concern as cancer now at earlier ages

Chimney sweep – first occupational cancer
scrotal cancer, described 1775

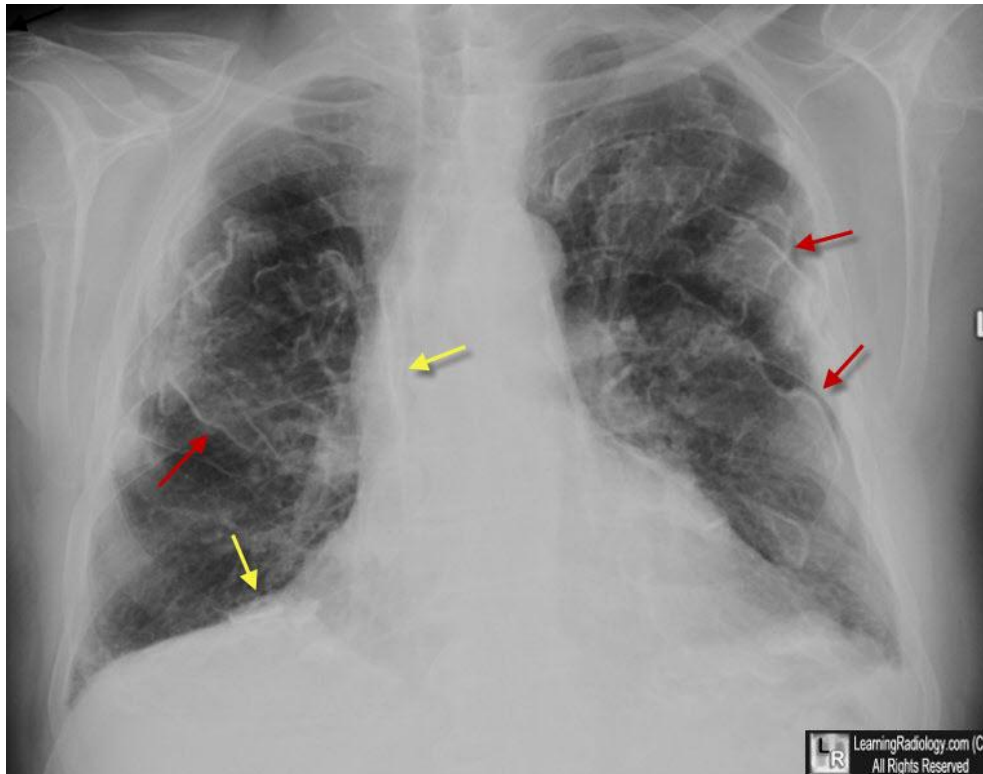


Asbestos

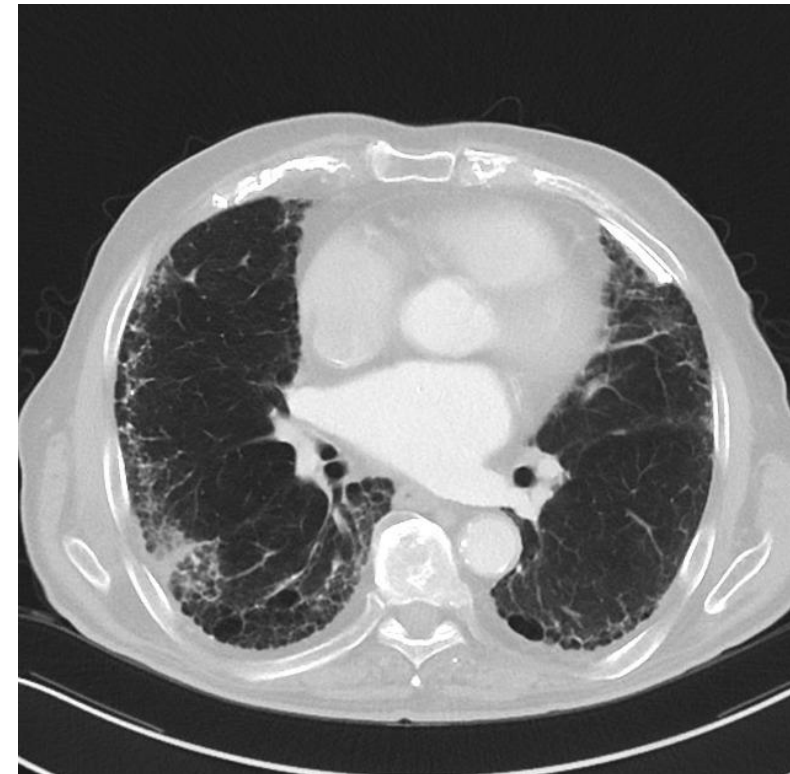
- Uses:
- Asbestos was used extensively in the past, particularly in building and construction from the 1940s to the 1980s, due to its fire resistance, insulation, durability, and affordability. Common products included [asbestos cement sheets](#) for roofing and cladding, [textured coatings](#) (like "popcorn" ceilings), vinyl floor tiles, and insulation for walls and pipes, shipbuilding
- Problems:
- adverse health effects, such as [asbestosis](#), [lung cancer](#), and [mesothelioma](#), were discovered, its manufacture and use were banned in many countries, including Australia in 2003
- Long latency, still 800 cases mesothelioma annually in Australia

Asbestos Xray, plaques, mesothelioma

Plain film



CT scan



Asbestos

Reserve Bank reno, 1.1 billion dollars, half asbestos remove



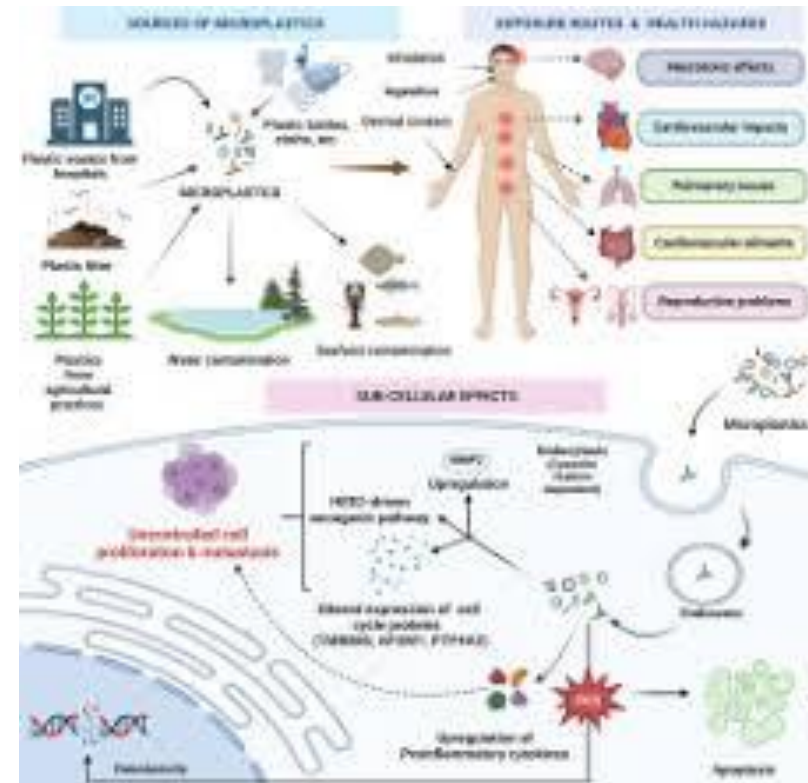
India ship breaking

toxic waste pollution, and severe labor safety concerns, including long hours and dangerous working conditions for workers.



New environmental factors

- Microplastics
- Microplastics may increase cancer risk by acting as carriers for toxic chemicals, causing DNA damage, disrupting cell signaling, and inducing chronic inflammation.
- Studies have detected microplastics in human bladder cancer tissue, and evidence suggests they may promote tumor growth, cell migration, and metastasis in cancers such as colorectal and breast cancer.



Forever chemicals – fire-fighting, non stick pans, tap water

- **Known as “Forever Chemicals,” PFAS (Per- and poly-fluoroalkyl substances)** chemicals are a family of synthetic chemicals that build up in humans and are linked to numerous health problems including cancer.
- **The two most widely detected PFAS chemicals, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS),** have been used extensively in products for their properties of high stability and low surface tension. PFOA and PFOS are found in items ranging from cookware and paper food packaging to personal care products, carpeting and firefighting foam, and provide stain resistance.
- **PFOA is a suspected endocrine (hormone) disruptor and possible carcinogen, and PFOS has been linked to fertility problems.**
- **Several PFAS chemicals, especially PFOA, have been linked to increased risk for breast cancer.**
- **3 banned in Australia, estimated 14,000 worldwide**

Per- and Poly-Fluoroalkyl Substances (PFAS)

WHAT:

PFASs are a family of synthetic chemicals that build up in humans and are linked to many health problems including cancer. Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) are the common PFASs.

FOUND:

PFAS chemicals are used in non-stick cookware, personal care products, dental floss, stain-resistant carpeting and furniture, outdoor clothing and gear, and food packaging. They are also used in firefighter gear and foams.

SCIENCE:

PFOA is a suspected endocrine (hormone) disruptor and possible carcinogen, and PFOS has been linked to fertility problems. Several PFASs, especially PFOA, have been linked to increased risk for breast cancer.

TOP TIPS:

If you use non-stick cookware, choose ceramic coated or cast iron. Stainless steel is also a safe option. Avoid food wrappers treated with grease-resistant coatings. Avoid “anti-aging” cosmetics containing PTFE.

Radiation induced cancer

- 85% radiation is natural, 14% from X Rays
- 1% nuclear tests – declining since last atmospheric test in 1993.
- Nuclear meltdowns, only ever 2 Chernobyl and Fukushima
- Miners and Aircrew
- Not nuclear power station workers
- ? Mobile phones
- Small doses may be good for health

Seychelles and Granite



Nuclear tests Maralinga



Vulcan bomber – used in anger in Falklands



Fukushima, one of only 2 meltdowns

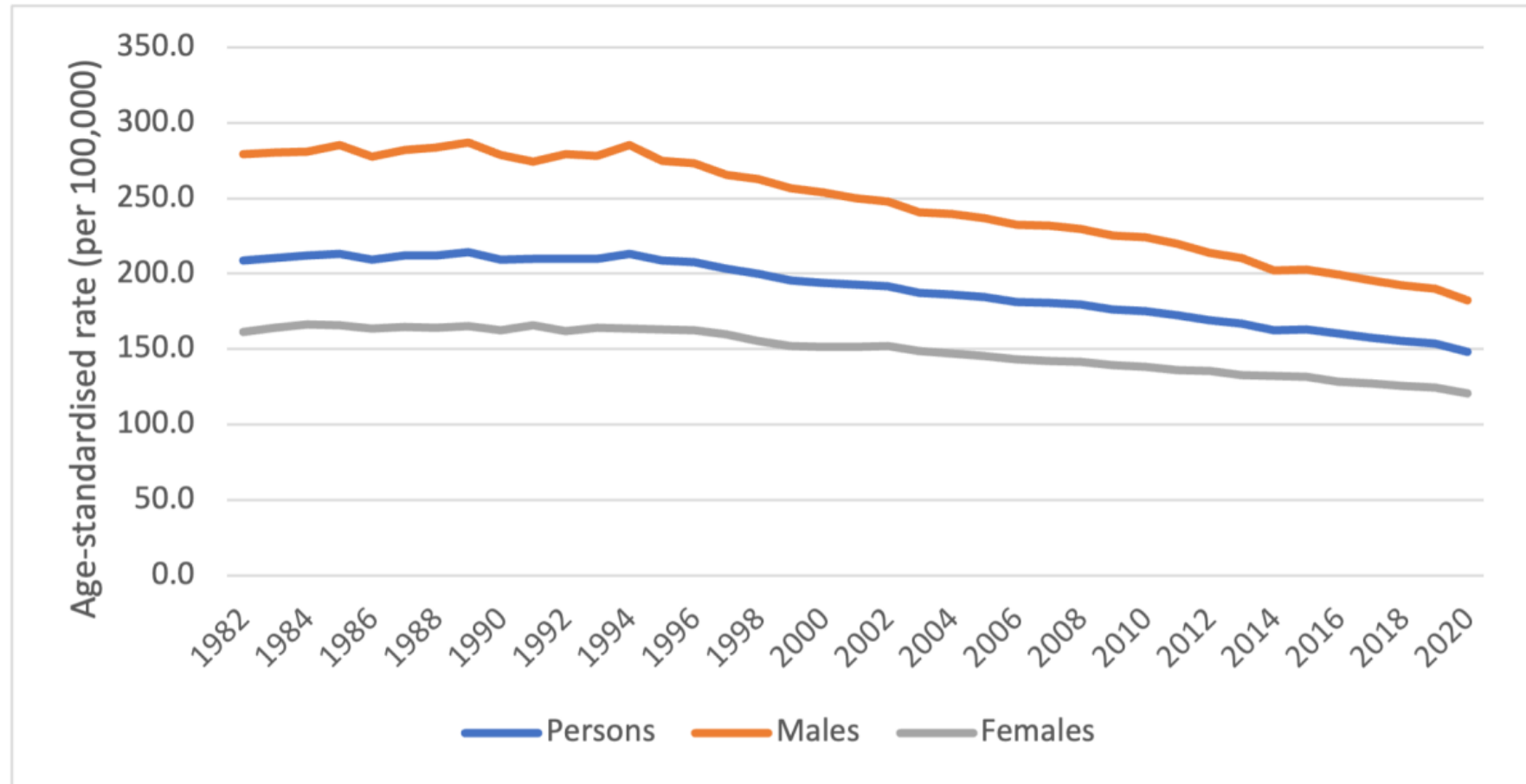
Nil lives lost from radiation

- No radiation-related deaths or acute diseases have been observed among the workers and general public exposed to radiation from the accident,” the report reads. “No discernible increased incidence of radiation-related health effects are expected among exposed members of the public or their descendants.”

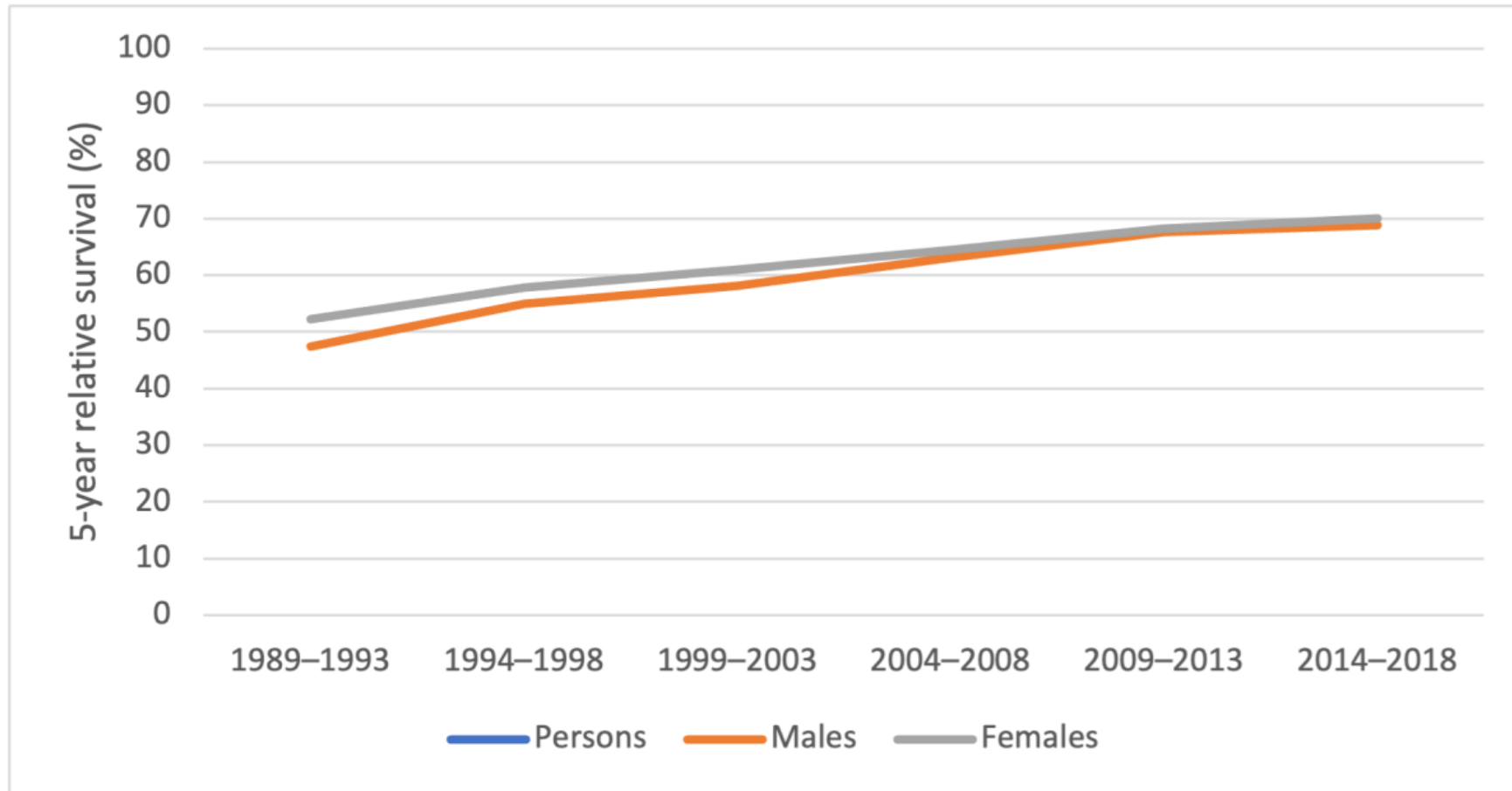
20,000 died from flood



Cancer- Annual mortality rates , down 50%



5 year Cancer survival rates – 50% improved

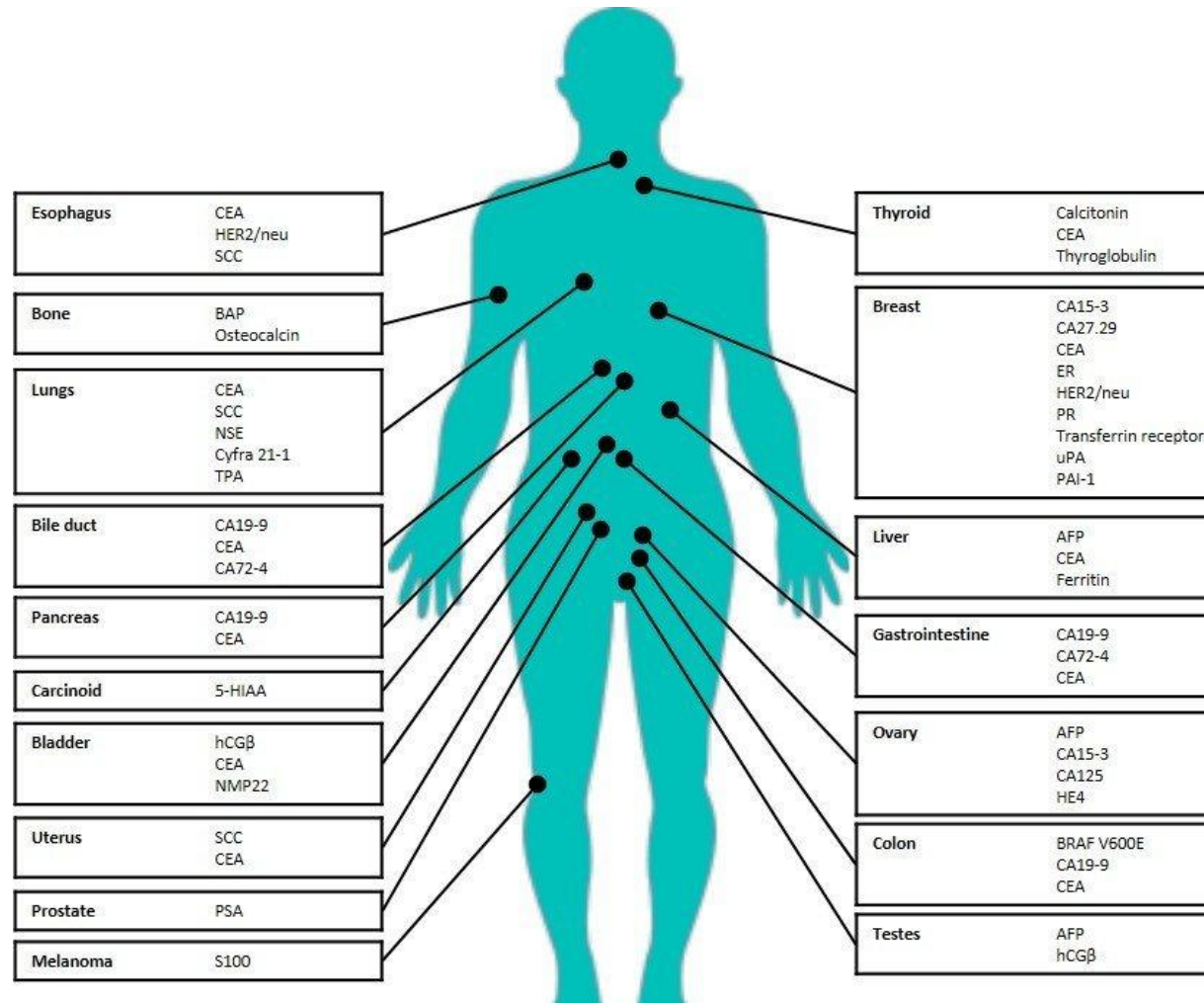


Cancer screening 1

- Lung – Xray, sputum exam, bronchoscopy – cigs
- Stomach - endoscopy
- Bowel – stool occult blood, colonoscopy - diet
- Breast - mammography - HRT
- Cervix – cervical smear – STD, HPV, vaccine
- Prostate – blood PSA, rectal exam
- Skin Ca - regular exam - sunshine
- Melanoma –regular skin checks (third most common Ca)

Cancer screening 2- genetics v environment

- Pick the right parents – many are inherited eg bowel cancer, breast, testing for tumour markers.



Skin cancer incidence

• Rank	Country	Number	ASR/100,000
• World		324,635	3.4
• 1	Australia	16,171 36,600	34
• 2	New Zealand	2,801	31.6
• 3	Denmark	2,886	29.7
• 4	The Netherlands	8,310	27.0
• 5	Norway	2,567	26.4
• 6	Sweden	4,266	23.3
• 7	Switzerland	3,357	21.6
• 8	Germany	31,468	20.5
• 9	Slovenia	735	19.7
• 10	Finland	2,090	19.5

Skin cancers

melanoma



BCC



Skin cancers

SCC



Kaposi sarcoma (AIDS)



Melanoma treatments

- Surgery alone + nodes. poor outcome, if spread
- Adjuvant immunotherapy pre-surgery – long term benefit – listed on PBS on 1 August expensive– 50% 5year survival
- New TIL therapy – uses bodies own T cells, re-engineered and reinjected
- Melanoma, mRNA vaccine in trials

Stomach cancer

causes

- Food preservatives –smoked food, salted food, pickles
- Alcohol
- Cigarettes
- H Pylori infection -eradication
- obesity
- Genetic (Japan) ? diet

endoscopy

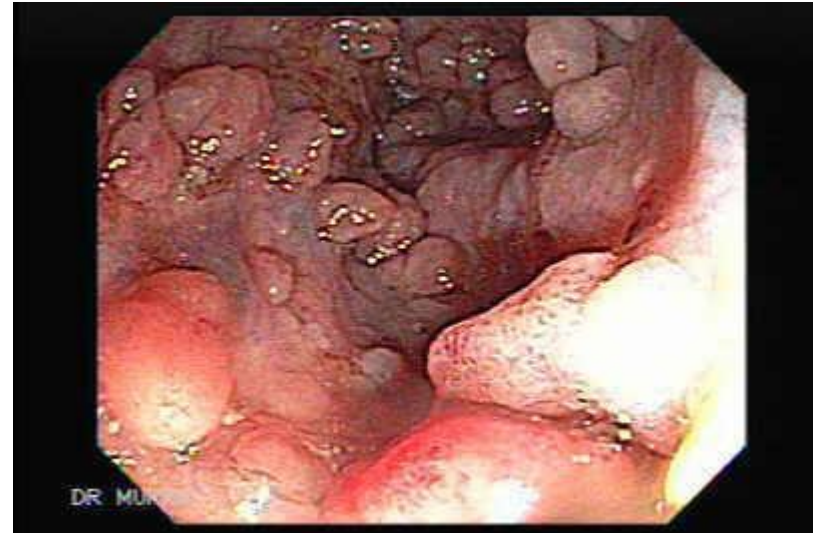


Bowel cancer images

XR



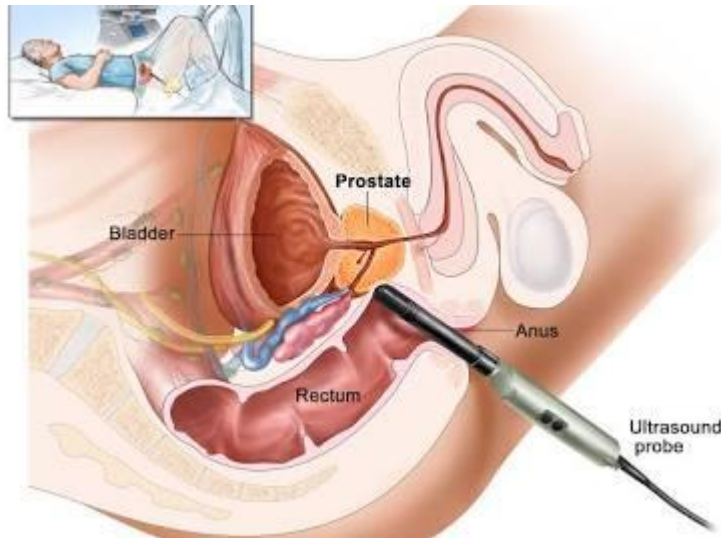
Endoscopy - Familial polyposis



Prostate cancer

causes genetic, black African, obesity, ageing

investigation



treatment

- Surgery
- radiation therapy
- Hormone therapy
- chemotherapy
- Sipuleucel-T (Provenge) is the only FDA-approved cancer vaccine for prostate cancer,

Prostate Cancer investigation

- 29,000 cases in Australia in 2025, 4000 deaths
- Rectal exam
- PSA (prostate specific antigen) screening test
- Not reliable, found many insignificant Ca
- New review of evidence, PSA check reduces death rate
- 5-year survival increased from 58% in 1982, to 96% in 2021

Female cancers

Uterus/ cervix

- Diagnosis with scans
 - Surgery
 - Chemotherapy
 - Radiation therapy
 - Hormone therapy
-
- mRNA HPV vaccine, in early teens
 - HPV also associated with head and neck cancers

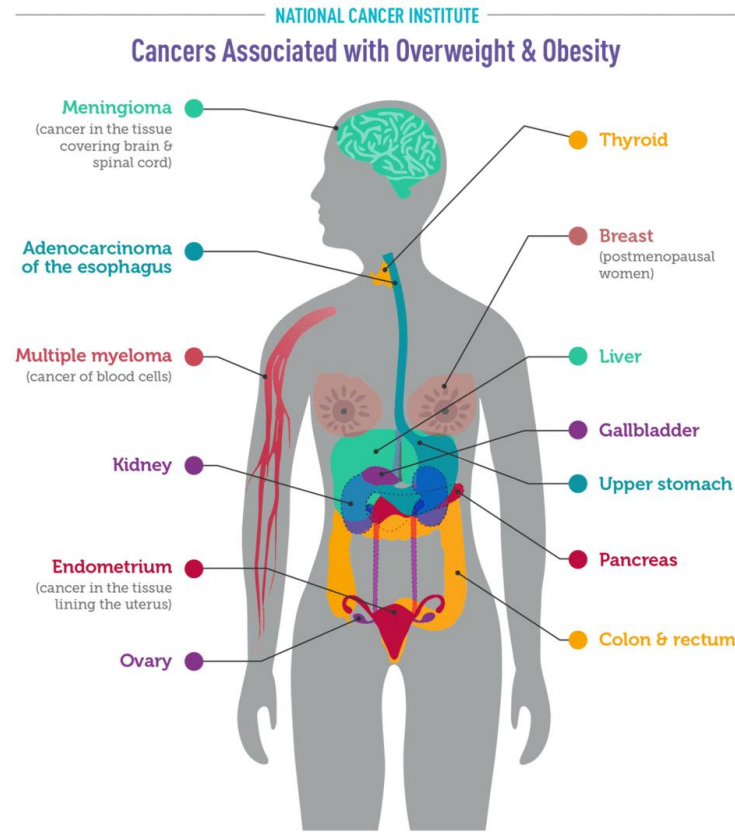
Ovarian cancer

- Problem with late presentation
- Treatment options as opposite
- Genetic markers, eg BRCA 1 and 2, alter treatment options

Diet and cancer

- A recent study of Seventh Day Adventist Church members, over 8 years, showed a 12% cancer reduction in vegetarians, 24% reduction in vegans. The primary reduction was in stomach and bowel cancer, but there were also reductions in breast and prostate cancer, and lymphoma.
- Recent studies have shown that central obesity increases the risk of many cancers

Obesity and cancer



cancer.gov/obesity-fact-sheet
Adapted from Centers for Disease Control & Prevention

Cancer prevention, increase risk group previous Ca, pre neoplasia, FH, occupation

- Stop smoking, alcohol moderation
- Diet – fruit, vegetables, fibre, red meat, obesity
- Skin - Vitamin B3
- Prostate- finasteride
- Breast – tamoxifen
- General – cholesterol treatment -statins

Cancer Prevention 1, risk factors

- Age most important risk factor
- Diet: Increased fruit and veg reduces bowel and breast cancer as well as weight, diabetes, cholesterol, BP. ? Phyto oestrogens.
- Smoking, URT and LRT, upper GIT, renal, colon, breast
- Weight reduction: Obesity associated with breast Ca, bowel and other gastro tumours. Review 2023, 4-8% of tumours due to obesity.
- Tea (*Camellia sinensis*): flavonoids, anti-oxidants,. Effective in animal studies, not proven in humans. Green tea some effect (polyphenols)
- Vitamins: anti-oxidant vitamins, A,C,E, no benefit. High dose C may increase risk. Possible Vit D.
- Selenium nil effect, ? Calcium benefit
- U/V light exposure reduced
- Resveratrol (grape skins), possible benefit. Alcohol increase risk of gut Ca but more with beer and spirits (wine in moderation)

Cancer prevention 2. Diet possibilities

- Turmeric (*Curcuma domestica*)— lab, animal experiments slows spread
- Brassica family (Cabbage, cauliflower, sprouts), used 2000 years.
Contain isothiocyanates, inhibit G/I cancers in animals
- Allium family (onions, garlic), reduced risk stomach Ca
- Umbelliferous family (carrots, celery), protective in diet surveys
- Solanaceous vegetables (tomatoes, peppers), protective in diet surveys
- American cancer institute also has some evidence for ginger, soy, liquorice, linseed, citrus

Cancer prevention 3, possible plant chemicals

Anti- Ca effect in Lab experiments (not trials):

- Anthraquinones – rhubarb (*Rheum palmatum*), senna (*Cassia spp*), cascara (*Rhamnus purshiana*), yellow dock (*Rumex crispus*)
- Berberine – Berberis (*Berberis vulgaris*), Goldenseal (*Hydrastis canadensis*)
- Furanocumarins- Angelica (*Angelica sinensis*)
- Flavonoids – Ferns (*Dryopteris erythrosora*)
- Others: Stilbenes, phytosterols, isoflavones etc
- Positive epidemiological studies:
- Olive oil (*Olea Europa*)
- Soy (*Glycine soja*)
- Licorice (*Glycyrrhiza glabra*) liver tumours in hepatitis

Oligoscan

- Cancer and its treatments can significantly impact the body's nutritional balance and detoxification capacity. Heavy metal accumulation and mineral deficiencies are common concerns for cancer patients, as they can:
- **Weaken the immune system**
- **Interfere with cellular repair and recovery**
- **Increase oxidative stress**, which may worsen inflammation
- By using Oligoscan, patients and practitioners can:
- **Identify toxic metal overload** that may compromise health
- 21 minerals, 16 heavy metals ? significance. FDA approved, ?TGA
- **Detect mineral imbalances** that affect energy, immunity, and healing
- It measures **skin** levels not body levels

Cancer prevention 4 metals

- Possible link between copper, iron, iodine, phosphorus, and zinc levels and development of different cancer types, with the exception of colon cancer. Selenium serum levels were instead inversely related to cancer risk.
- the individual necessity of supplementation with food supplements, especially micronutrients, should always be critically questioned as long as there is no evident deficiency.

Heavy metals and cancer, continued

- The main elements found in the biological samples of the patients included Pb, Cr (VI), As, Cd, and Ni and these elements were identified in many studies. Generally, the levels of these metals in clinical cases were higher than in controls, which demonstrates the carcinogenicity of these metals. In addition, the investigation of the effect of essential metals such as Se, Zn, Fe, and Mn on the occurrence of adverse health effects revealed that low concentrations of these elements indicated anticancer properties and that their high concentrations could be the cause of biological toxicity.
- Note variation from previous slide –different opinion

Cancer prevention 5 Aspirin

- The [three-year randomised controlled trial](#) involved 2,980 patients, with bowel cancer one group taking 160mg of aspirin daily, starting within three months of surgery, and the other receiving a placebo. The aspirin-treated group had less than half the risk of recurrence – a highly significant effect size.
- Current trial 11,000 patients with bowel, breast, oesophagus/stomach, prostate cancer, results due in 2027.

Table 2. Current recommendations for the prevention of cancer⁴⁸

Cancer site	Likely risk reduction	Possible risk reduction
Breast		Vegetables, vitamin A, olive oil
Colon	Fibre, calorie reduction	Vitamin A, C, D, E, calcium, selenium
Rectum	Wheat, brassica, vegetables	Folic acid, methionin
Cervix	Betacaroten, vitamin C, E	Vegetables
Endometrium		Vegetables
Kidney		Fruit, vegetables
Liver		
Lung	Vegetables, fruit	Vegetables, fruit, betacaroten, fish, vitamin A, C, E
Oesophagus		Vitamin A, B ₁₂ , C, E, fruit
Stomach		Selenium, folic acid, vegetables
Ovaries		
Pancreas		Fruit, vegetables
Pharynx, larynx		Vitamins, vegetables, fruit
Prostate		Fruit, vegetables
Skin		betacaroten, fruit, vitamin C, E

Cancer (the crab) treatment

- Second most common cause of death in developed world – bowel, breast, lung.
- Common in developing world- different cancers (diet)– stomach, uterus
- Alternative treatments used by between 25 and 50 % of cancer cases
- Additional (or alternative) options include:
 - Meditation
 - Coffee enemas
 - High dose vitamins, supplements
 - Herbals – eg 1000 articles on breast Ca – no benefit
 - 5% of patients abandon orthodox treatment for alternative – with a worse outcome
 - Many patients take both – drug interactions

Excess Vitamins may increase cancer risk

- Beta carotene, Vit A – smokers on Vit A have more lung cancer
- Vitamin C reduces breast, prostate, endometrial cervical, oesophageal, pancreas cancer incidence
- High dose I/V vitamin C unproven benefit
- Vitamin E= increase of prostate cancer
- Vitamin D – no effect
- Calcium – 50% increase in cancer mortality
- Avoid alcohol, cigarettes, excess weight, processed foods
- Vitamins best from fruit and veg

Orthodox cancer treatments

- Surgery: ? Prostate, Breast ? Lump v mastectomy, lung ? V chemo
- Laser (skin, lung, colon, liver)
- Chemotherapy
- Radiotherapy – causes but also cures eg breast, prostate, lymphoma
- Brachytherapy – radio-active seeds
- Prostate – finasteride
- Breast – tamoxifen, hormone therapy

Plants get Cancer, have protecting chemicals

Agrobacterium radiobacter

Normal soil bacterium

Contains abnormal DNA

Induces cancer

Attacks 140 different plants, eg:

Walnut trees, grape vines, stone
fruit trees, sugar cane

Bacterium attaching to carrot cell



World traditional plant cancer treatments

- 1960-1980, 35,000 plants examined for anti-Ca potential, 3 new drugs
- 1980- 1995, 10,000 plants examined, 4 potential new drugs
- Traditional treatment, worldwide examples:
- Mistletoe (*Viscum album*), Clover (*melilotus officinalis*), Silver birch (*Betula alba*), Autumn crocus - colchicine (*Colchicum autumnale*), Europe.
- Greater celandine (*Chelidonium majus*), Astragalus(Spp), Camptothecin (*Camptotheca acuminata*), China.
- Butternut (*Juglans cinerea*), North America
- Pau d'Arco (*Tabebuia spp*), Lapachol (*Tabebuia spp*),South America
- Cancer bush (*Sutherlandia frutesens*), South Africa
- Boswellia (*Boswellia serrata*), Ayurveda

Plant derived chemotherapy 1

Mistletoe

- Used for 100 years in Germany
- Activates immune system
- Germany often part of orthodox
- Pancreatic Ca
- Colon Ca
- Breast Ca
- Bladder Ca

Viscum album



Plant derived chemotherapy 2

Madagascar periwinkle

- Traditional treatment diabetes
- No effect on sugar but WBC
- Produces leucopenia
- Contains vincristine, vinblastine
orthodox treatment for
leukaemia

Catharanthus roseus



Plant derived chemotherapy 3

Pacific Yew tree

- 40 years research
- Produced from needles of English Yew tree (*Taxus baccata*)
- Taxol (paclitaxel)
- Stops cell division
- Treatment of metastases from Ovarian, breast, lung cancers

Taxus brevifolia



Plant derived chemotherapy 4

Maytansine

- Maytenus dhofarensis traditional use for stomach pains
- M Buchanii is related African plant
- Contain maytansine
- Arrests cell division
- Affect similar to taxol but side effects
- Was trialled for stomach cancer

Maytenus buchanii



Plant derived chemotherapy 5

African bush willow tree

- Used by Xhosa tribes for Cancer
- Contains combrestatins
- Used in combination with other agents for colon, lung Ca and leukaemias

Combretum cafferum



Plant derived chemotherapy 6.
Mandrake root (*Mandragora officinarum*) – source
of etoposide, lung cancer therapy



Other plant derived chemotherapy

- American mandrake (*Podophyllum peltatum*) - Etoposide – lung and testicular Ca . Also topical use for warts
- Homoharringtonine (*Ceplaoxus homoharringtonia*) - CML
- Milkweed, radium weed (*euphorbia peplus*) – skin Ca (withdrawn)
- Many more in research
- Don't forget laetrile – in vogue in 1970's apricot kernels (*Rosaceae* spp) – an expensive and life-shortening fraud. Contained cyanide! Available on-line as amygdalin or “B17” – it is not a vitamin
- Shark cartilage – sharks don't get cancer!!
- Magic mushrooms- psilocybin – improves mood

The Laetrile scam

- Amygdalin derived from cracking open apricot and others kernels
- Synthetic form Laetrile (incorrectly called Vit B17), used since 1950's as cancer treatment. Popular in 1970's
- Makes hydrogen cyanide, converted to cyanide in body
- Side effects –peripheral neuropathy, spinal cord, vision, death
- Cochrane review 2015, no benefit
- Laetrile banned US, UK Europe, in 1979, still on-line
- Frequent referrals to poisons centre after apricot nut consumption
- Sale of raw apricot kernels banned Australia 2015

Common wormwood (Artemisia alba)

- Scientists from the University of Sharjah have found that a naturally growing aromatic plant contains ingredients with the ability to treat colorectal cancer.
- The plant is a common herb.
- It is scientifically known as *Artemisia herba-alba*.
- new research2025



Sugar substitute may treat pancreatic cancer

- **Researchers at Hiroshima University have found that stevia, when fermented with specific bacteria from banana leaves, gains a remarkable ability to kill pancreatic cancer cells while leaving healthy kidney cells unharmed.**
- **Stevia (*Stevia rebaudiana*), candyleaf plant, 50 to 300 times sweeter than sugar.**

Specifically, the team fermented stevia leaf extract with plant-derived *Lactobacillus plantarum* SN13T strain (FSLE) and compared its effects on pancreatic cancer (PANC-1) cells in the lab

- Laboratory results, reported July 2025.

Gut microbiome

- Now, researchers at the National Cancer Center Japan say they have discovered how a previously unknown group of gut bacteria can boost the efficacy of a class of anticancer drugs.
- In a study published July 2025 in the journal Nature, NCCJ researchers said this bacteria group, which they named YB328, was found to improve the performance of cancer therapies called immune checkpoint inhibitors.
- The researchers analyzed stool samples from 50 patients with lung and stomach cancer who underwent checkpoint inhibitor therapies, examining the performance of the drugs for each patient and their gut microbiome. The genomic analysis showed that a group whose therapies worked had higher ratios of bacteria belonging to the Ruminococcaceae family, while those who didn't see improvement after checkpoint inhibitor therapies had higher ratios of other types of bacteria.

Herbal support treatment

- Immune stimulating properties:
- Cat's claw (*Uncaria tomentosa*)
- Echinacea (*purpurea*)
- Aloe (*barbadensis*)
- Nausea control:
- Marijuana (*Cannabis sativa*), Ginger (*Zingiber officinalis*)
- Use in combination may interfere with chemo effect
- Pain control:
- Opioids (*Papaver somniferum*)

Cancer caused by plant toxicity

- Tobacco (*Nicotiana tabacum*) – lung, plus various
- Comfrey (*Symphytum officinale*) – Europe - liver cancer
- Birthwort (*Aristolochia clematis*) – renal, GU
- *Aristolochia fangii* – mistaken for *Stephania tetandra* – renal cancers
- Betel (*Piper betel*) – Pacific -mouth cancer (?lime)
- Kudzu (*Pueraria montana*) – Asia, US, oestrogenic
- ?Plant oestrogens and effect on hormone related tumours, eg breast, prostate

Betel nut – seed of *Areca catechu* palm, wrapped in betel leaf

More recreational substances

- Contains arecoline, mild stimulant
- Banned in Australia
- Recreational use Middle East, India, Pacific islands
- Used to treat schizophrenia ??
- Side effects – hypothyroid, infertility, heart, CNS
- Mouth cancer (Lime)

Areca palm



Table 1. Herbal treatments relating to cancer therapy

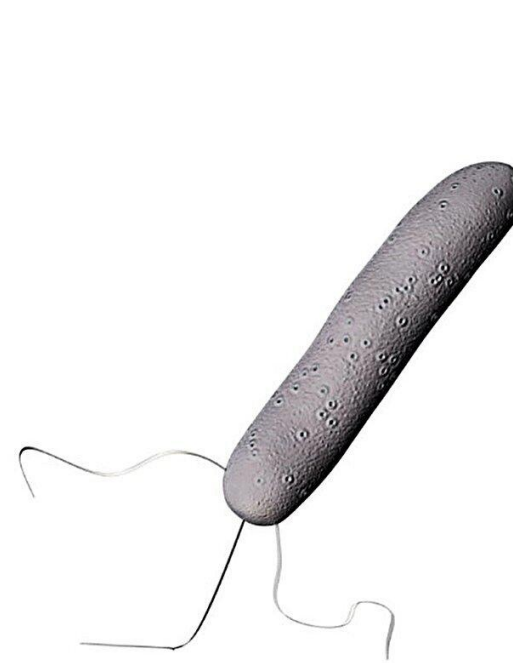
	Orthodox treatment of herbal origin	Herbs with some clinical/laboratory evidence	Herbs with anecdotal evidence
Prophylaxis		Green tea (<i>Camellia sinensis</i>) Turmeric (<i>Curcuma domestica</i>) Garlic (<i>Allium sativum</i>) Onion (<i>Allium cepa</i>) Soy (<i>Glycine soja</i>) Brassica family Liquorice (<i>Glycyrrhiza glabra</i>) Ginseng (<i>Panax ginseng</i>)	<i>Panax ginseng</i> Garlic (<i>Allium sativum</i>) Ginger (<i>Zingiber officinale</i>)
Treatment	Vinca alkaloids (<i>Catharanthus rosea</i>) Taxol (<i>Taxus brevifolia</i>) Homoharringtonine (<i>Cephalotaxus spp.</i>)	Mistletoe (<i>Viscum album</i>) Greater celandine (<i>Chelidonium majus</i>) Clover (<i>Melilotus officinalis</i>)	Pau 'd'arco (<i>Tabebuia spp.</i>) Astragalus (<i>Astragalus membraneceus</i>) Tylophora indica Echinacea purpurea
Supportive treatment	Morphine (<i>Papaver somniferum</i>) Dronabinol (<i>Cannabis sativa</i>)	Marijuana (<i>Cannabis sativa</i>) St John's wort (<i>Hypericum perforatum</i>)	

Herbal/Supplement Clinical Trials

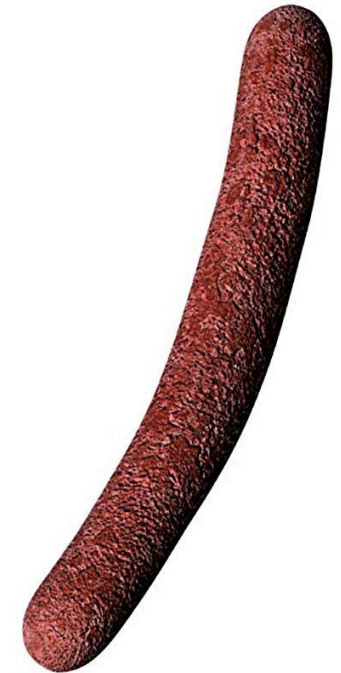
- Herbal advertising contains testimonials, pseudoscience, misinformation “may help with prostate health”.
- Where are the clinical trials?
- The average cost of phase 1, 2, and 3 clinical trials across therapeutic areas is around US \$4, 13, and 20 million respectively. Pivotal (phase 3) studies for new drugs approved by the Food and Drug Administration (FDA) of the United States cost a median of \$41,117 per patient. Cost may be as high as \$100 million.
- Advertising cheaper than trials
- If proven can't be patented (natural)

Novel Japanese therapy, oncolytic bacteria

- these AUN bacteria produce exceptional tumor eradication in both murine and human cancer models, even in immunocompromised environments—all without the help of immune cells. The therapy exhibits high biocompatibility and minimal side effects, including suppression of cytokine release syndrome (CRS).
- Theoretical approach



Proteus mirabilis
[阿形 (A-gyo)]



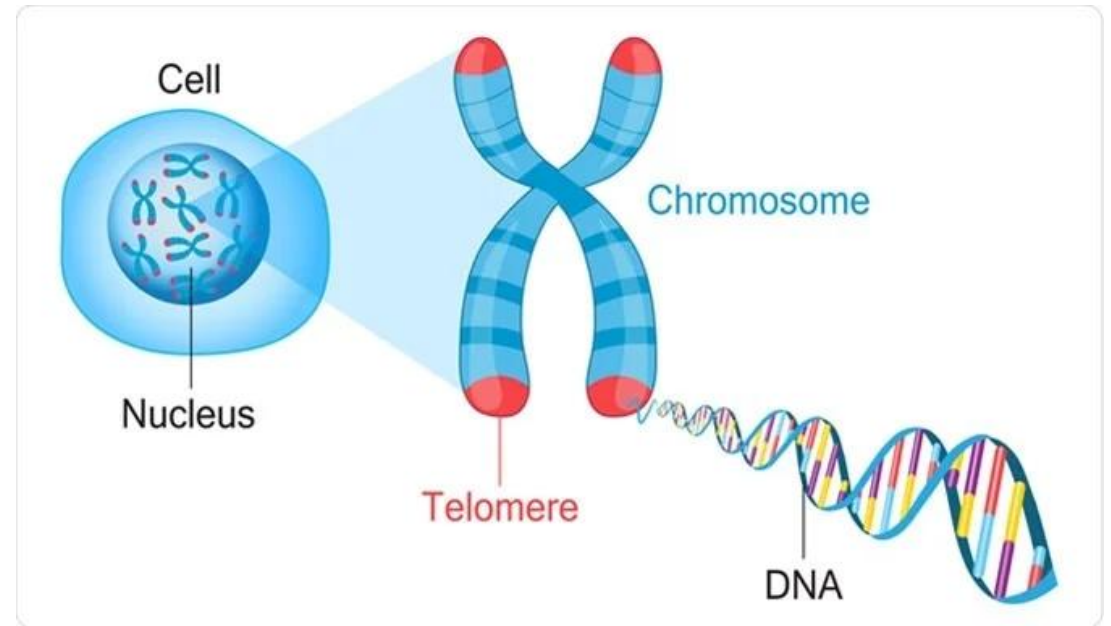
Rhodopseudomonas palustris
[吡形 (UN-gyo)]

The humble earthworm, *lumbricus terrestris*

- The simple earthworm, *Lumbricus terrestris*, has increasingly been used as an indicator of environmental pollution, as a “canary,” not in the coal mine, but in the ground. It is an unusual creature, with five hearts, no arms, legs, teeth, or eyes. It typically lives 1 to 2 years, but can hibernate in the cold, and remain dormant for thousands of years.
- earthworms, like many invertebrates, [do not get cancer](#); the earthworm’s immune system has the ability to kill cancer cells
- Another surprising source of cancer investigation is provided by bats; like elephants, naked mole rats and whales, they also have low rates of tumour formation. Unsurprisingly, the rats were picked for further research!
- One chemical, labelled lumbricine, is unique to earthworms and has been extensively researched in China and Japan, as a treatment for tumours in mice. Another complex protein, earthworm fibrinolytic protein, also has tumour suppressing properties; research continues.

Telomeres and old age

- Anti-telomerase
- Vitamin D supplements show promising results in helping maintain telomere length by slowing cellular aging, according to recent studies like the VITAL trial. Other research has explored [TA-65](#) (a proprietary ingredient derived from traditional Chinese medicine) for its potential to activate telomerase, the enzyme that lengthens telomeres. Additionally, certain phytochemicals such as [EGCG](#) (from green tea), [resveratrol](#), and [quercetin](#) have been linked to positive effects on telomere length.



Opposite- Anti-telomerase research

- Telomerase is central to cellular immortality and is a key component of most cancer cells although this enzyme is rarely expressed to significant levels in normal cells. Therefore, the inhibition of telomerase has garnered considerable attention as a possible anticancer approach.
- Many of the methods applied to telomerase inhibition focus on either of the two major components of the ribonucleoprotein holoenzyme, that is, the telomerase reverse transcriptase (TERT) catalytic subunit or the telomerase RNA (TR) component.

Anti-telomerase treatment

- Another potent direct synthetic inhibitor of telomerase is imetelstat (GRN163L). Imetelstat is a 13-base oligonucleotide (5'-TAGGGTTAGACAA-3'), that binds directly to the telomerase RNA component. It is used as a treatment in numerous diseases, such as myelofibrosis, thrombocytopenia and various types of cancer.
- Natural sources altering telomerase activity (Lab):
 - Telomerase Inhibitors from Natural Products and Their Anticancer Potential, 2018
 - Brassica vegetables, Ginger, Tea, Blueberries, Mistletoe, Sage, Curcumin, Garlic, Resveratrol, many more

Anti-oxidants and cancer- hot off the press 3/26. Published in Nature. The glutathione story

- Glutathione protects against cell damage, consists of 3 amino acids
- Produced by the body
- Cancer cells now found to use it as fuel, contain high levels
- Blocking glutathione reduced breast cancer growth
- Advised REDUCE anti-oxidant intake with cancer
- Similar story with taurine, and N acetyl-cysteine - converts to glutathione.
- Perhaps anti-oxidants are not all good?
- Avoid anti-oxidant supplements with cancer

Unproven approaches

- Cryotherapy
- Oxygen therapy
- Red light therapy
- Acupuncture
- Cupping
- Vitamins
- Extreme diets
- Frequency generators A healing frequency generator is a device or software that emits specific sound, light, or electromagnetic frequencies. Proponents believe these tones (like Solfeggio frequencies or the 7.83Hz Schumann resonance) promote relaxation and reduce stress. However, their effectiveness as medical treatments remains largely unproven by science

Cancer – the future is brighter

- 1 Better screening with blood tumour markers, dogs can sniff cancer, a new sweat test may prove reliable
- 2 DNA examination -better targeting of chemo for each Ca
- 3 CAR-T therapy (chimeric antigen receptors)– immunotherapy remove patients T cell lymphocytes, reprogram to attack patient's cancer, re-insert – 10 year leukaemia remissions with CAR-T therapy
- 4 Individualised vaccines, mRNA
- 5 Radiation isotopes bound to cells (RPT) targeted at specific cancer, then injected
- 6 improved surgery with imaging defining tumour

The problems of ageing

