

# 癌症治療新趨勢下的 緩和護理

高雄醫學大學附設中和紀念醫院

血液腫瘤內科 專科護理師

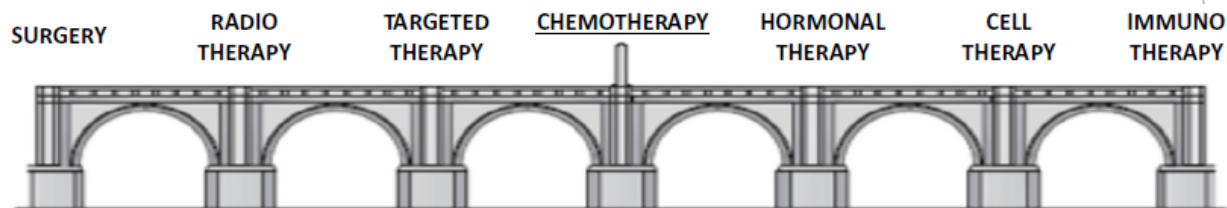
楊靜宜

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# outline

- ▶ Cancer therapy
- ▶ Toxicity Management
- ▶ Nursing care
- ▶ Long-Term follow up

# Cancer therapy



## CHEMOTHERAPY: 80 cytotoxic drugs

Azacitidine	Capecitabine	Cladribine	Clofarabine	CPX-351	Cytarabine	Decitabine	Fludarabine	Fluorouracil	Gemcitabine
Methotrexate	Nelarabine	Pemetrexed	Pralatrexate	Raltitrexed	Trifluridine	Altretamine	Bendamustine	Busulfan	Carboplatin
Carmustine	Chlorambucil	Cisplatin	Cyclophosphamide	Dacarbazine	Estramustine	Fotemustine	Ifosfamide	Lobaplatin	Lomustine
Mechlorethamine	Melphalan	Miriplatin	Mitomycin C	Nedaplatin	Nimustine	Oxaliplatin	Procarbazine	Ranimustine	Semustine
Streptozotocin	Temozolomide	Thiotepa	Trabectedin	Treosulfan	Trofosfamide	Actinomycin D	Amsacrine	Mithramycin	Bleomycin
Peplomycin	Cabazitaxel	Docetaxel	Eribulin	Ixabepilone	Nab-paclitaxel	Paclitaxel	Vinblastine	Vincristine	Vindesine
Vinflunine	Vinorelbine	Aclarubicin	Amrubicin	Belotecan	Daunorubicin	Doxil	Doxorubicin	Epirubicin	Etoposide
Idarubicin	Irinotecan	Mitoxantrone	Nal-IRI	Pirarubicin	Pixantrone	Teniposide	Topotecan	Valrubicin	Ingenol

# Type of monoclonal antibodies

Types of monoclonal antibodies.

Type	Key Concepts	Examples
Murine Ends in -omab	Uses harvested B lymphocytes from mice that are fused with an immortal myeloma cell line lacking the hypoxanthine-guanine-phosphoribosyltransferase gene Allergic reactions are common in humans, with potential limited benefit because of a short half-life	Blinatumomab Moxetumomab pasudotox-tdfk
Chimeric Ends in -ximab	Approximately 65% human derived, 35% murine derived, uses murine antigen-specific variable region, and heavy and light chains of human Demonstrate extended half-life in human with reduced immunogenicity; still able to induce anti-drug antibodies	Cetuximab Rituximab
Humanized Ends in -zumab	Murine hypervariable regions of the light and heavy chains are fused onto a human Ab framework; approximately 95% human Has decreased production of anti-drug antibodies; limitations because the process to create is difficult	Alemtuzumab Ado-trastuzumab emtansine
Human Ends in -umab	Fully human monoclonal antibodies Less antigenic and better tolerated; appear to have the longest half-life in humans	Necitumumab Denosumab

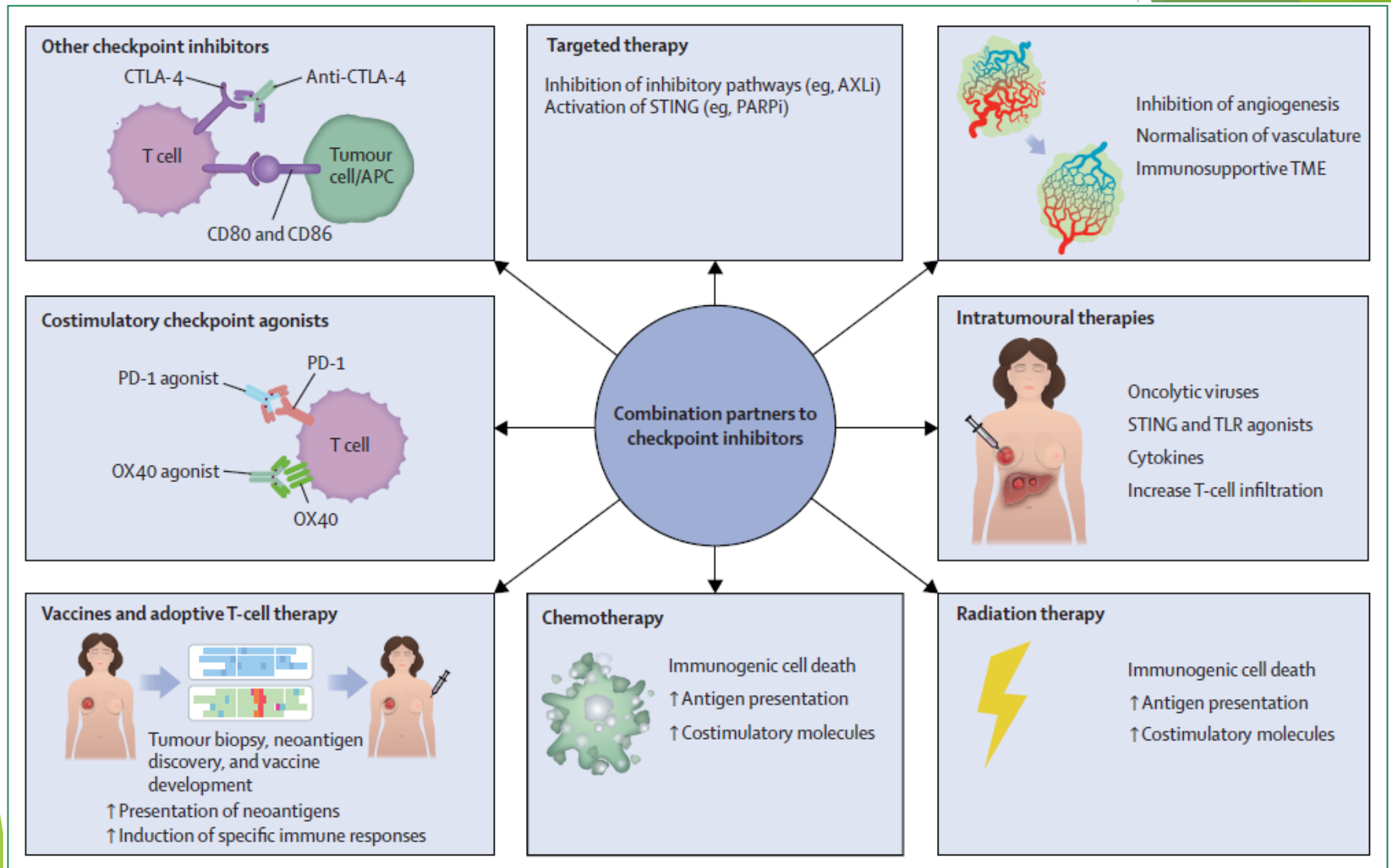
Data from Buss et al<sup>6</sup> and Garcia Merino.<sup>7</sup>

# Type of Checkpoints inhibitors

ICPI Monoclonal Antibody	Trade Name	Mechanism of Action
Ipilimumab	Yervoy	CTLA-4 inhibitor
Pembrolizumab	Keytruda	PD-1 inhibitor
Nivolumab	Opdivo	PD-1 inhibitor
Atezolizumab	Tecentriq	PD-L1 inhibitor
Avelumab	Bavencio	PD-L1 inhibitor
Durvalumab	Imfinzi	PD-L1 inhibitor
Cemiplimab	Libtayo	PD-1 inhibitor

CTLA-4: Cytotoxic T-lymphocyte antigen 4; ICPI: Immune checkpoint inhibitors; PD-1: Programmed cell death 1;  
PD-L1: Programmed cell death ligand 1.

# Combination partners for Immunotherapy



# Chemotherapy Side Effect

## Chemotherapy Side Effect



*Intravenous (IV) Chemotherapy*



*Patient*



*Fatigue*



*Hair Loss*



*Kidney Problems*



*Mood Changes*



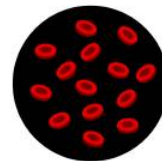
*Weight Changes*



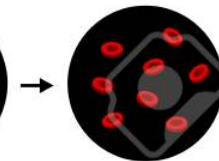
*Increase Risk of Bleeding and Bruising*



*Infection*



*Normal*



*Anemia*



*Dry Skin*



*Brain Fog*



*Nausea*



*Vomiting*



*Constipation/ Diarrhea*



*Difficulty Swallowing*



*Muscle Pain*



*Loss of Libido*



*Fertility Problems*

# Toxicities

**Table 1** Different classes of new cancer drugs, frequently used agents, and main toxicities

Agent	Target	Indications	Toxicities
<b>Monoclonal antibodies</b>			
Rituximab Ofatumumab Obinutuzumab	CD20	B-cell lymphomas and leukemias	CRS Immunodeficiency
Trastuzumab	HER2neu	Breast cancer	Cardiac disease
Cetuximab	EGFR	Colorectal cancer	Diarrhea Exanthema
Bevacizumab	VEGF	Colorectal cancer Breast cancer Renal cell cancer NSCLC	Hypertension GI bleeding or perforation Thromboembolism
Ramucirumab	VEGFR	Gastric cancer	
<b>Tyrosine kinase inhibitors</b>			
Imatinib Dasatinib	BCR-ABL	CML ALL	Pleural/pericardial effusions Pulmonary hypertension
Ponatinib			Thromboembolism
Erlotinib	EGFR	NSCLC Pancreatic cancer	Exanthema, diarrhea GI bleeding or perforation
Idelalisib	PI3K	B-cell lymphoma	Pneumonitis Colitis, hepatitis
Trametinib	MEK	Melanoma	Diarrhea, edema Decrease of LVEF
Aflibercept Axitinib	VEGF VEGFR	Colorectal cancer Renal cell cancer	Hypertension GI bleeding or perforation Thromboembolism PRES

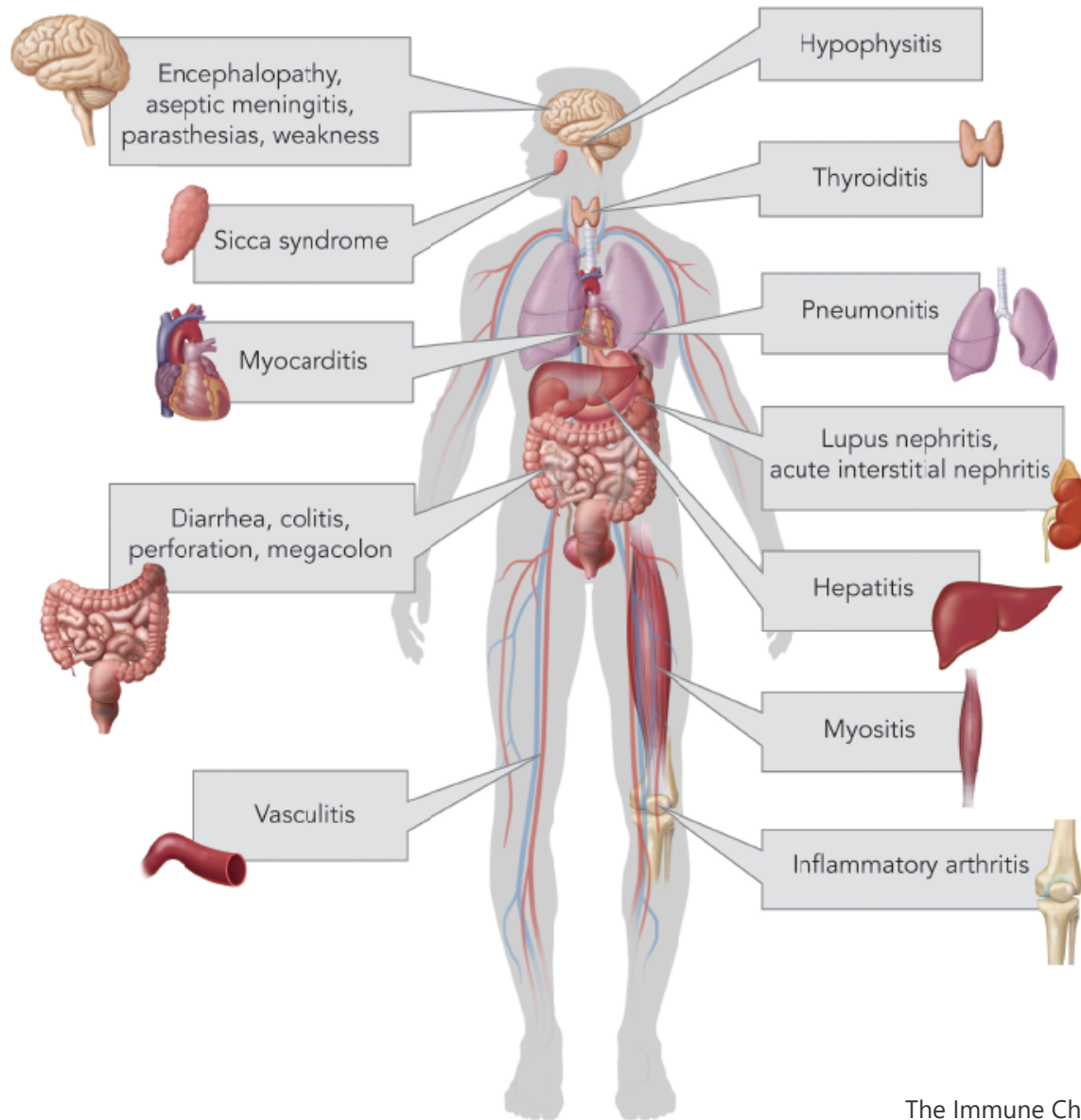


# Toxicities

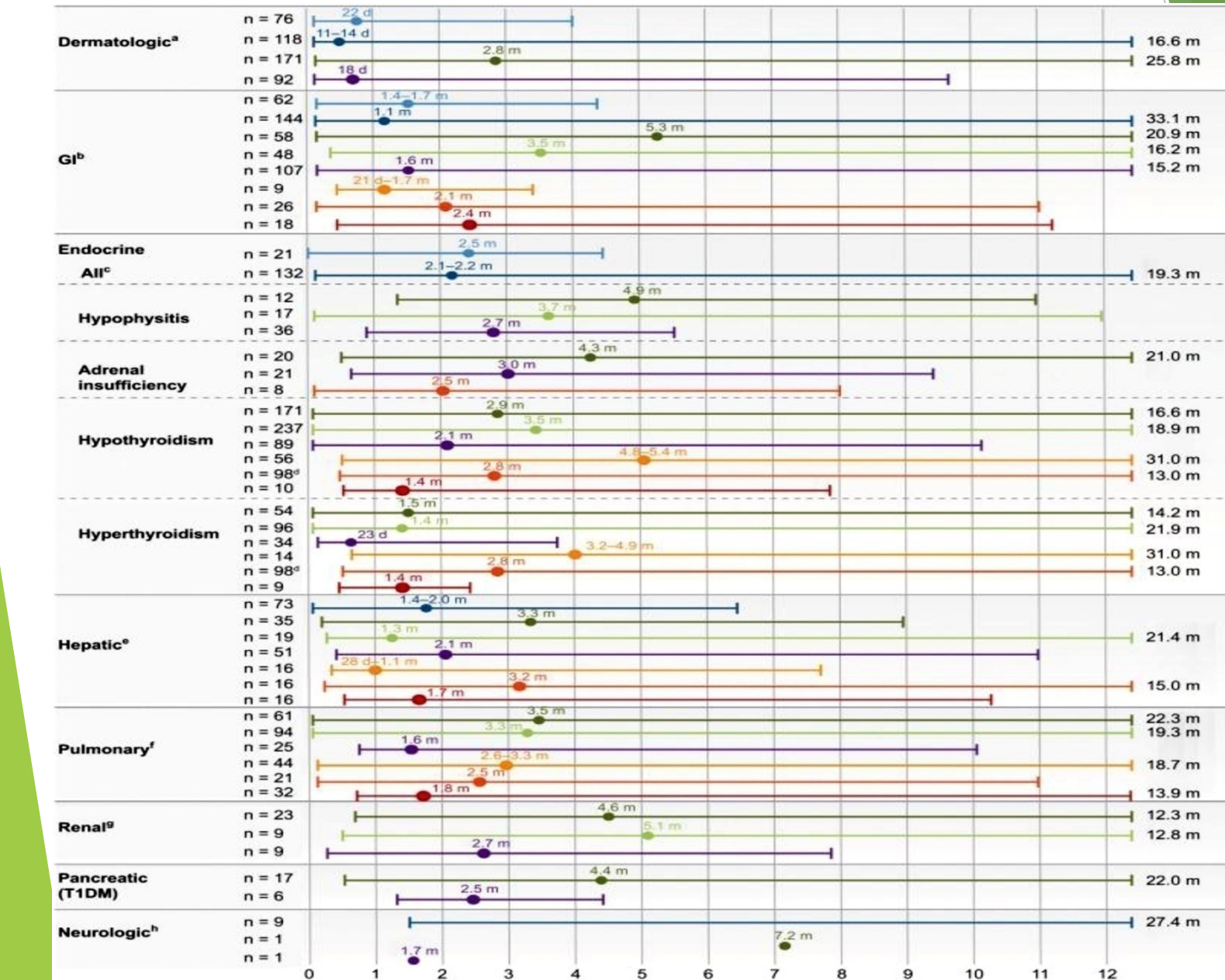
**Table 1** Different classes of new cancer drugs, frequently used agents, and main toxicities

Agent	Target	Indications	Toxicities
Sorafenib Sunitinib Pazopanib	Multiple kinases	Renal cell cancer GIST Soft tissue sarcoma	Decrease of LVEF Hypertension
Bispecific antibodies (BAB)			
Blinatumomab	CD3/CD19	ALL B-cell lymphomas	CRS Neurotoxicity (e.g., convulsions) Liver toxicity (transaminitis)
Checkpoint inhibitors			
Ipilimumab	CTLA-4	Melanoma	IRAEs: Diarrhea, colitis Hypophysitis Immunhepatitis Polyarthritits
Nivolumab Pembrolizumab	PD-1	Melanoma NSCLC RCC Hodgkin's lymphoma	
Cellular treatments			
CAR T cells	CD19	ALL B-cell lymphomas	CRS Neurotoxicity (e.g., convulsions, encephalopathy, or ischemia)

# Common Immune-Related Adverse Events



# Time to onset of immune-mediated toxicities



Anti-CTLA-4  
 Ipilimumab 3 mg/kg

Anti-PD-1  
 Nivolumab

Anti-CTLA-4 + Anti-PD-1  
 Nivolumab + Ipilimumab

Anti-PD-L1  
 Atezolizumab

Durvalumab

Months

# Treatment of immune checkpoint inhibitor-related toxicity

**Table 2**  
**Treatment of immune checkpoint inhibitor-related toxicity**

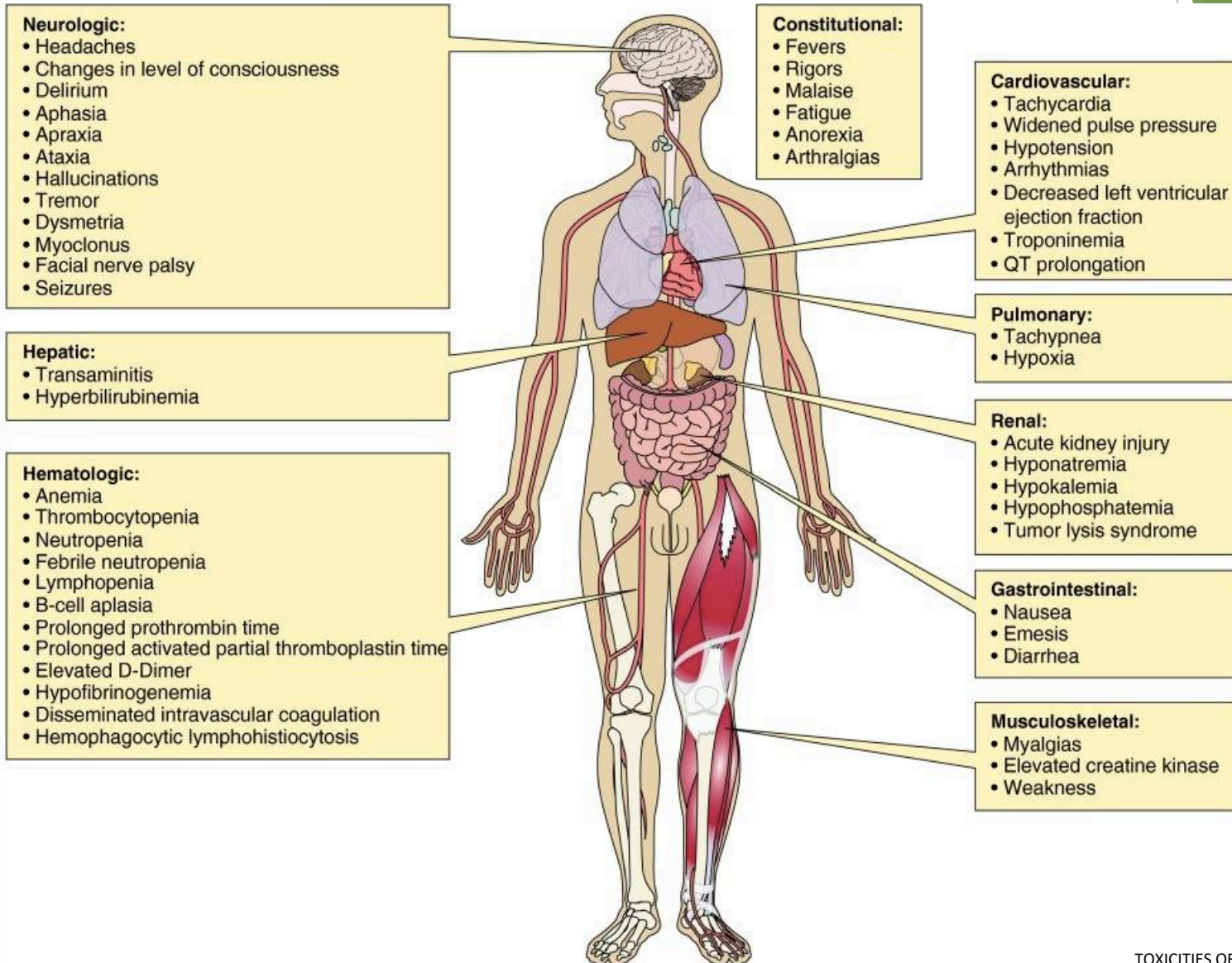
Type of Toxicity	First-Line Therapy <sup>a</sup>	Second-Line Therapy <sup>a</sup>
Pneumonitis (grade 3–4)	<ul style="list-style-type: none"> <li>• Methylprednisolone 1–4 mg/kg/d (slow taper)</li> </ul>	<ul style="list-style-type: none"> <li>• Infliximab 5 mg/kg</li> <li>• MMF 1 g q 12 h</li> <li>• IVIg for 5 d</li> <li>• Cyclophosphamide</li> </ul>
Cardiotoxicity-myocarditis (grade 3–4)	<ul style="list-style-type: none"> <li>• Methylprednisolone 1–2 mg/kg/d or 1 g/d</li> </ul>	<ul style="list-style-type: none"> <li>• MMF</li> <li>• Infliximab</li> <li>• Anti-thymocyte globulin</li> <li>• Tacrolimus</li> <li>• IVIg</li> </ul>
Neurotoxicities: (Grade 3–4)		
Guillain-Barre syndrome/Myasthenia gravis	<ul style="list-style-type: none"> <li>• IVIg (0.4 mg/kg/d) or plasmapheresis</li> <li>• Pyridostigmine</li> </ul>	<ul style="list-style-type: none"> <li>• Consider Methylprednisolone 1–4 mg/kg/d<sup>b</sup></li> <li>• Azathioprine</li> <li>• Cyclosporine</li> <li>• MMF</li> </ul>
Aseptic meningitis/encephalitis	<ul style="list-style-type: none"> <li>• Methylprednisolone 1–2 mg/kg/d</li> </ul>	<ul style="list-style-type: none"> <li>• Methylprednisolone (1 g/d)</li> <li>• + IVIg if no improvement</li> <li>• Rituximab</li> </ul>
Transverse myelitis	<ul style="list-style-type: none"> <li>• Methylprednisolone 2 mg/kg/day-1 g/d</li> <li>• IVIg</li> </ul>	<ul style="list-style-type: none"> <li>• Plasmapheresis</li> <li>• IVIg</li> </ul>



# Common side effects of CRA-T therapy

Side Effect	Symptoms	Treatment	Nursing Assessment
Cytokine release syndrome	Fever, myalgia, headache, anorexia, nausea and vomiting, renal dysfunction, coagulopathy, hypotension, capillary leak, and pulmonary edema	Acetaminophen, narcotics, total parenteral nutrition, antiemetics, renal dosing of medications to dialysis, fresh frozen plasma, cryoprecipitate, platelets, vasoactives, tocilizumab, methylprednisone, oxygen support, and intubation	Take vital signs every four hours. Do daily lab tests or electrolytes, hepatic function, coagulation factors, C-reactive protein, lactate dehydrogenase, and ferritin.
Graft-versus-host disease	Rash, diarrhea, and hyperbilirubinemia	Topical triamcinolone and possible systemic treatments with calcineurin inhibitors or steroids (only in discussion with CAR T-cell therapy team)	Skin assessment and output assessment
Neurologic symptoms	Confusion, B-cell aphasia, unresponsiveness, and seizures	Supportive care (e.g., reorientation, antiepileptics)	Neurologic examinations
Tumor lysis syndrome	Hyperuricemia, hyperkalemia, hyperphosphatemia, and hypocalcemia	Allopurinol and hydration	Daily electrolytes

# CAR-T Related CRS toxicities





# Nursing Care

- ▶ 清楚各類治療的副作用及處置
- ▶ 治療期間密切觀察
- ▶ 衛教病人及家屬相關知識或提供衛教手冊
- ▶ 定期追蹤、管理

# Infusion- Related Reactions

Signs, symptoms and management of infusion-related reactions.<sup>3</sup>

Signs and symptoms	Management
<ul style="list-style-type: none"><li>• Chills or shaking</li><li>• Urticaria</li><li>• Flushing</li><li>• Dyspnea or wheezing</li><li>• Hypotension</li><li>• Pyrexia</li><li>• Back pain</li><li>• Abdominal pain</li></ul>	<p>Avelumab can cause Grade 3* or Grade 4 infusion-related reactions.</p> <p>Patients should be premedicated with an antihistamine<sup>†</sup> and acetaminophen before the first four infusions and for subsequent doses based upon clinical judgment and presence/severity of prior infusion-related reactions.</p> <p>Monitor patients for signs and symptoms of infusion-related reactions.</p> <p>Interrupt or slow the infusion for Grade 1 or Grade 2 infusion-related reactions.</p> <p>Permanently discontinue avelumab for Grade 3 or Grade 4 infusion-related reactions.</p>

Data from Bavencio® prescribing information. EMD Serono, 2017.<sup>3</sup>

\* Grade 1 = mild; Grade 2 = moderate; Grade 3 = severe; Grade 4 = life-threatening.

<sup>†</sup> Diphenhydramine, cetirizine, loratadine, fexofenadine; choice of agent as clinically appropriate and per institution guidelines/formulary.



# Cytokine-release syndrome

**Table 2** Main symptoms of cytokine-release syndrome

## Constitutional

Fever, 發燒, 發冷, 頭痛, 虛弱, 肌痛, 關節痛, 後背痛 back or  
abdominal pain 或腹痛

## Organ related

Oliguria, 少尿, 支氣管痙攣, 呼吸困難, 低血壓, 心動過速, tachycardia,  
arrhythmia, 心律不整, 精神錯亂, 紅斑, 蕁麻疹, 瘙癢 pruritus

## Lab tests

Hypotension, 低血壓, 腎小球濾過率↓, 血球及凝血功能異常, alteration of C-reactive  
protein and/or procalcitonin 常, CRP/PCT ↑

# Signs and symptoms of imAEs

Signs, symptoms and management of immune-mediated adverse events.<sup>3</sup>

imAEs	Signs and symptoms	Management
Pneumonitis	<ul style="list-style-type: none"> <li>• New or worsening cough</li> <li>• Shortness of breath</li> <li>• Chest pain</li> </ul>	<p>Monitor patients for signs and symptoms of pneumonitis and evaluate suspected cases with radiographic imaging.</p> <p>Administer corticosteroids for <math>\geq</math> Grade 2* pneumonitis.</p> <p>Withhold ICI for Grade 2 and permanently discontinue for Grade 3, Grade 4, or recurrent Grade 2 pneumonitis.</p>
Hepatitis	<ul style="list-style-type: none"> <li>• Yellowing of skin or whites of eyes</li> <li>• Dark urine</li> <li>• Severe nausea or vomiting</li> <li>• Pain at the right side of abdomen</li> <li>• Drowsiness</li> </ul>	<p>Monitor patients for abnormal liver tests before and periodically during treatment.</p> <p>Rule out other infectious etiology, administer corticosteroids for <math>\geq</math> Grade 2 hepatitis.</p> <p>Withhold ICI for Grade 2 immune-mediated hepatitis until resolution and permanently discontinue for Grades 3 or 4 immune-mediated hepatitis.</p>
Colitis	<ul style="list-style-type: none"> <li>• Diarrhea or more bowel movements than normal</li> <li>• Blood in stool or dark, tarry, sticky stool</li> <li>• Severe abdominal pain or tenderness</li> </ul>	<p>Monitor patients for signs and symptoms of colitis.</p> <p>Administer corticosteroids for <math>\geq</math> Grade 2 colitis. Withhold ICI until resolution for Grade 2 or 3 colitis and permanently discontinue for Grade 4 or recurrent Grade 3 colitis upon re-initiation.</p>
Endocrinopathies		
Hypophysitis	<ul style="list-style-type: none"> <li>• Rapid heartbeat</li> </ul>	<p>Monitor patients for signs and symptoms of hypophysitis (including hypopituitarism and adrenal insufficiency), thyroid function (before and after treatment, and periodically during treatment), and hyperglycemia.</p>
Adrenal insufficiency	<ul style="list-style-type: none"> <li>• Increased sweating</li> <li>• Worsening or severe fatigue</li> </ul>	<p>Administer corticosteroids and hormone replacement as appropriate. Withhold ICI for Grade 3 or Grade 4 adrenal insufficiency or thyroid dysfunction.</p>
Thyroid disorder	<ul style="list-style-type: none"> <li>• Feeling more hungry or thirsty than usual</li> </ul>	<p>Manage hypothyroidism with hormone replacement therapy. Manage hyperthyroidism with medical management as indicated. Anticipate patients who initially present with hyperthyroidism will become hypothyroid. Withhold ICI for Grade 3 or Grade 4 thyroid disorders.</p>
Diabetes mellitus	<ul style="list-style-type: none"> <li>• Hair loss</li> <li>• Mood or behavioral changes</li> <li>• Feeling cold</li> <li>• Constipation</li> <li>• Voice gets deeper</li> <li>• Hypotension</li> <li>• Urinating more than usual</li> <li>• Dizziness or fainting</li> <li>• Abdominal pain</li> <li>• Headache</li> </ul>	<p>Monitor patients for hyperglycemia or other signs and symptoms of diabetes.</p> <p>Withhold ICI and administer anti-hyperglycemics or insulin in patients with <math>\geq</math> Grade 3 hyperglycemia and resume treatment when metabolic control is achieved.</p>
Nephritis and renal dysfunction	<ul style="list-style-type: none"> <li>• Urinating less than usual</li> <li>• Blood in urine</li> <li>• Swelling of ankles</li> <li>• Loss of appetite</li> </ul>	<p>Monitor for elevated serum creatinine before and periodically during treatment.</p> <p>Administer corticosteroids for <math>\geq</math> Grade 2 nephritis. Withhold ICI for Grade 2 or Grade 3 nephritis until resolution to Grade 1 or lower. Permanently discontinue for Grade 4 nephritis.</p>

# Supportive care guidelines for patients receiving CAR T cells

Toxicity	Preventive and supportive care interventions
Constitutional	<p>Administer acetaminophen for symptomatic management of fevers in patients with normal hepatic function;</p> <p>Provide cooling blankets for fevers <math>&gt;40^{\circ}\text{C}</math>;</p> <p>Avoid corticosteroids and NSAIDs; and</p> <p>Avoid meperidine</p>
Cardiovascular	<p>Stop or taper antihypertensive medications prior to cell infusion;</p> <p>Monitor vital signs at least every 4 h on an inpatient unit for at least 9 d following infusion;</p> <p>Monitor vital signs every 2 h in patients with fevers and tachycardia;</p> <p>Initiate replacement IV fluids for patients with poor oral intake or high insensible losses to maintain net even fluid balance;</p> <p>Administer IV fluid boluses for patients with SBP less than their preinfusion baseline:</p> <ul style="list-style-type: none"> <li>Patients with a SBP <math>&lt;80\%</math> of their preinfusion baseline and <math>&lt;100</math> mm Hg receive a 1 liter normal saline bolus</li> <li>Patients with a SBP <math>&lt;85</math> mm Hg receive a 1 liter normal saline bolus regardless of baseline blood pressure</li> </ul> <p>Patients receiving <math>&gt;1</math> IV fluid bolus for hypotension or patients in the ICU for toxicity management have a serum troponin drawn, and an ECG and an echocardiogram performed to evaluate for cardiac toxicity; and</p> <p>Patients with hypotension are initiated on vasopressor support. Norepinephrine is the preferred first-line vasopressor</p>
Infectious disease	<p>Initiate prophylactic antimicrobials, such as trimethoprim-sulfamethoxazole, for <i>Pneumocystis</i> prophylaxis prior to conditioning chemotherapy;</p> <p>Initiate prophylactic antimicrobials, such as acyclovir or valacyclovir, for herpes virus prophylaxis prior to conditioning chemotherapy; and</p> <p>All patients with fevers and neutropenia have blood cultures drawn and broad-spectrum antibiotic coverage initiated</p>
Hematologic	<p>Initiate allopurinol for TLS prophylaxis in patients without a contraindication prior to conditioning chemotherapy;</p> <p>Transfuse packed red cells for goal hemoglobin of <math>\geq 8.0</math> g/dL;</p> <p>Transfuse platelets for a goal platelet count of <math>\geq 20\,000/\mu\text{L}</math>;</p> <p>Monitor complete blood count with differential twice daily. When ANC decreases to <math>&lt;500/\mu\text{L}</math>, initiate filgrastim support. Continue until ANC increases to <math>\geq 1500/\mu\text{L}</math>;</p> <p>Transfuse fresh frozen plasma with a goal of normalization of PTT in patients with a PTT <math>&gt;1.5</math>-fold above the upper limit of normal; and</p> <p>Transfuse cryoprecipitate to maintain fibrinogen of <math>\geq 100</math> mg/dL. If patient is bleeding, a higher level of fibrinogen should be maintained</p>
Neurologic	<p>The nursing staff conducts focused neurologic examinations every 8 h in patients experiencing neurologic toxicity;</p> <p>Perform brain MRI in any patient experiencing neurologic toxicity;</p> <p>Perform lumbar puncture to evaluate for infectious pathogens, cytokine levels, and CAR T-cell levels in patients experiencing neurologic toxicity whenever feasible;</p> <p>Request a neurology consultation for any patient experiencing neurologic toxicity; and</p> <p>Standard antiepileptic medications are used for patients having active seizures. We do not use prophylactic antiepileptic medications</p>

# Nursing Care

## ► Gastrointestinal Side Effects

### - diarrhea,colitis

- ✓ lipilimumab : 32.8%
- ✓ watery bowel movements, blood or mucus in stool, flatulence, and abdominal cramping
- ✓ 清淡飲食；避免高纖維/乳糖、脂肪、咖啡因、酒精
- ✓ Grade 4-> NPO
- ✓ 止瀉劑使用
- ✓ IVF

### - autoimmune hepatitis

- ✓ rare
- ✓ ALT,AST,Bil ↑, fatigue and low-grade fevers

# Nursing Care

## ► Pulmonary Side Effects

- 非感染性的間質性或肺泡性炎症反應
  - ✓ PD-1 : 9%
  - ✓ dyspnea, cough, fatigue, hypoxia, chest pain, hemoptysis
  - ✓ CxR : diffuse infiltrates, lobular nodularity with air trapping, interstitial fibrosis
  - ✓ Microscopic findings : diffuse lymphocytic infiltrates(PD-1)
  - ✓ 衛教病人及家屬相關症狀(shortness of breath, coughing, chest pain, fever)
  - ✓ 氧氣給予、SpO2、聽診呼吸音、確保充足的水分、減少呼吸道刺激、鼓勵戒菸

# Nursing Care

## ► Dermatological Side Effects

- Pruritus ,maculopapular rash, vitiligo, Stevens-Johnson syndrome, Sweet's syndrome, toxic epidermal necrolysis, bullous pemphigoid, lichen sclerosis
- Rash ,pruritus
  - ✓ ipilimumab : 50%
  - ✓ Nivolumab, pembrolizumab : 28%-37%

# Nursing Care

## ► Endocrine-related Side Effects

- hypophysitis(pituitary gland inflammation), thyroiditis, hypothyroidism, adrenal insufficiency
  - ✓ combination : 11%-17%
  - ✓ PD-1 monotherapy : <1%
- hypophysitis : headaches, dizziness, diplopia, loss of peripheral vision, extreme fatigue, irritability, cold intolerance, nausea, vomiting
- 監測生命徵象、心電圖、充足的水分和支持性護理

# Screening and Monitor of Endocrine Toxicity

## Before Immunotherapy

- Fasting venous glycemia (if anti-PD-1/PD-L1), natremia
- TSH, T4I
- 8 am cortisol (without corticosteroid intake) +/- ACTH (depending on 08:00 am cortisol level)
- LH, FSH, testosterone in males; LH, FSH, estradiol in females with irregular periods; FSH in menopausal females (gonadotropic axis activity in non-menopausal females without contraception is determined by cycle regularity)



## Immunotherapy onset



## Systematic biological evaluation during immunotherapy

At each course of treatment for 6 months, every 2 courses for the following 6 months, then in case of clinical alert signs

- Fasting venous glycemia (if anti-PD-1/PD-L1), natremia
- TSH, T4I
- 8 am cortisol
- Testosterone in males



# Nursing Care

## ► Cardiac Toxicities

- ✓ 少見(<1%)
- ✓ 平均發生時間：10wk ( 2days~8m+)
- ✓ mortality rate：50%
- ✓ 使用其他藥物也會增加心毒性風險 ( ex TKI)
- ✓ 臨床症狀：  
myocarditis, pericarditis, heart failure, arrhythmias.
- ✓ The most common arrhythmias include atrial fibrillation (30%), ventricular tachycardia/fibrillation (27%), and conduction abnormalities such as heart block (17%)
- ✓ 觀察生命徵象、心電圖、戒菸

# Late effects of radiotherapy and chemotherapy

<i>Organ system</i>	<i>Late effects/sequelae of radiotherapy</i>	<i>Late effects/sequelae of chemotherapy</i>	<i>Chemotherapeutic drugs responsible</i>
Bone and soft tissues	Short stature; atrophy, fibrosis, osteonecrosis	Avascular necrosis	Steroids
Cardiovascular	Pericardial effusion; pericarditis; CAD	Cardiomyopathy; CHF	Anthracyclines Cyclophosphamide
Pulmonary	Pulmonary fibrosis; decreased lung volumes	Pulmonary fibrosis; interstitial pneumonitis	Bleomycin, BCNU Methotrexate, adriamycin
Central nervous system (CNS)	Neuropsychologic deficits, structural changes, hemorrhage	Neuropsychologic deficits, structural changes Hemiplegia; seizure	Methotrexate
Peripheral nervous system		Peripheral neuropathy; hearing loss	Cisplatin, vinca alkaloids
Hematologic	Cytopenia, myelodysplasia	Myelodysplastic syndromes	Alkylating agents
Renal	Decreased creatinine clearance	Decreased creatinine clearance	Cisplatin Methotrexate
	Hypertension	Increased creatinine Renal filtration Delayed renal filtration	Nitrosoureas
Genitourinary	Bladder fibrosis, contractures	Bladder fibrosis; hemorrhagic cystitis	Cyclophosphamide
Gastrointestinal	Malabsorption; stricture; abnormal LFT	Abnormal LFT; hepatic fibrosis; cirrhosis	Methotrexate, BCNU
Pituitary	Growth hormone deficiency; pituitary deficiency		
Thyroid	Hypothyroidism; nodules		
Gonadal	Men: risk of sterility, Leydig cell dysfunction. Women: ovarian failure, early menopause	Men: sterility Women: sterility, premature menopause	Alkylating agents Procarbazine
Dental/oral health	Poor enamel and root formation; dry mouth		
Ophthalmologic	Cataracts; retinopathy	Cataracts	Steroids

CAD, coronary artery disease; CCF, congestive cardiac failure; LFT, liver function tests; BCNU, carmustine.

Source: Data from Ganz (1998, 2001)<sup>12,13</sup> and Aziz (2002, 2003).<sup>2,6</sup>

# Long-term side effects

## ► Emotional difficulties

癌症倖存者經常經歷積極和消極、害怕復發、憤怒、內心沮喪、焦慮和孤立的情緒。倖存者、照料者、家人和朋友也可能會經歷創傷後症候群，可能會發展為焦慮症。

✓ 轉介心理師或身心科門診

## ► Secondary or subsequent cancers

化學治療或放射線治療，抽菸、喝酒、肥胖也是一個危險因子

# Nursing Care

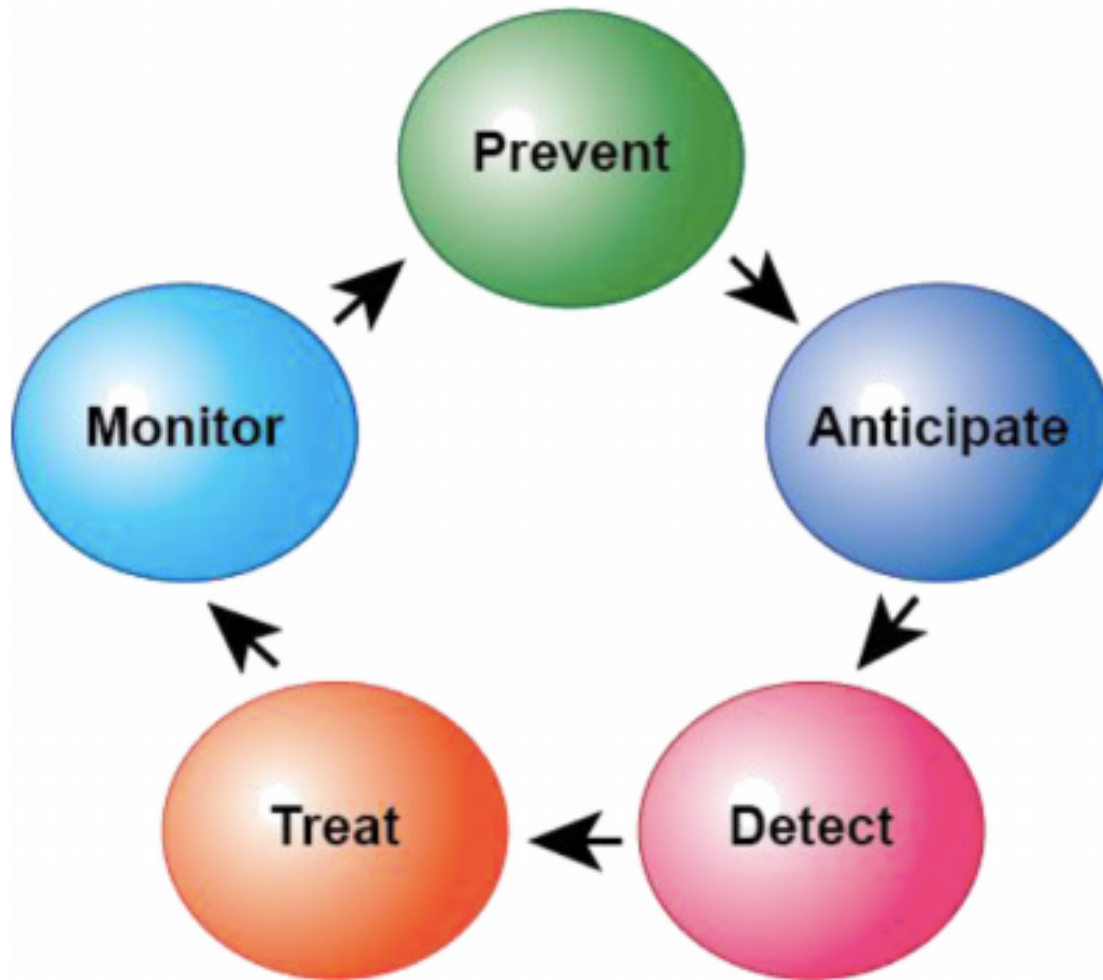
- ▶ Stopping tobacco use
- ▶ Reducing alcohol intake
- ▶ Eating well

選擇吃營養，健康的飲食可以幫助癌症倖存者治療後恢復體力。

- ▶ Exercising regularly

- ✓ 每周至少進行150分鐘的有氧運動，例如散步和阻力（力量）訓練，每週兩到三天。
- ✓ 提高生活品質，減少焦慮、憂鬱、疲憊

# Five Pillars of Immunotherapy Toxicity Management



# Summary

- ▶ 護理師是照護患者的最前線，必須了解各種不同的治療方法及副作用
- ▶ 做好衛教患者及家屬
- ▶ 預防及減少患者的症狀
- ▶ 提高病人存活率及生活品質