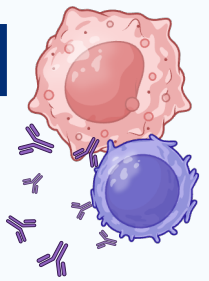


CANCER IMMUNOPREVENTION

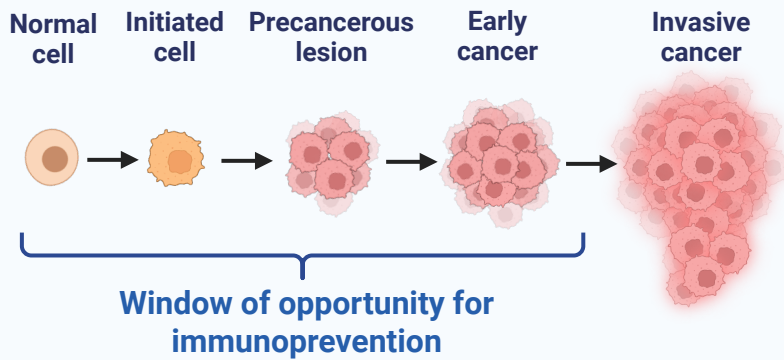


HARNESSING THE IMMUNE SYSTEM TO PREVENT CANCER BEFORE IT STARTS

Cancer immunoprevention aims to reduce the risk of cancer by boosting immune surveillance, eliminating early abnormal cells, and preventing tumor-promoting inflammation

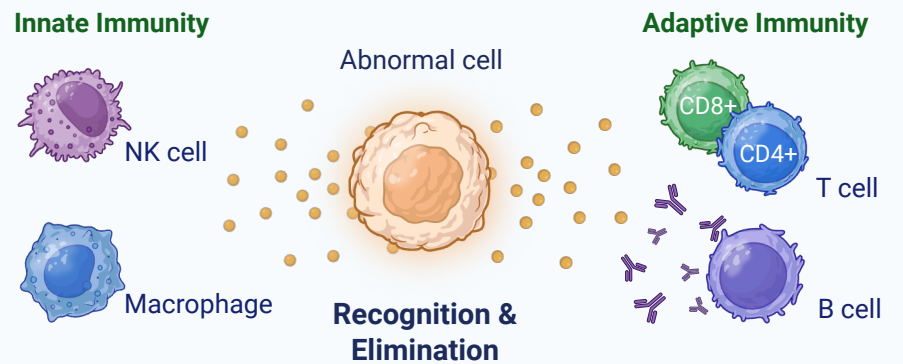
1. THE RATIONALE

Cancer develops through multiple steps over years to decades. Intervening early – before invasive cancer – offers the greatest opportunity to prevent disease.



2. IMMUNE SURVEILLANCE: NATURE'S FIRST LINE OF DEFENSE

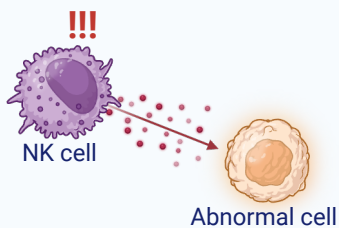
The immune system constantly patrols for abnormal cells and eliminates those with oncogenic changes.



Effective immune surveillance prevents transformation and eliminates emerging abnormal cells.

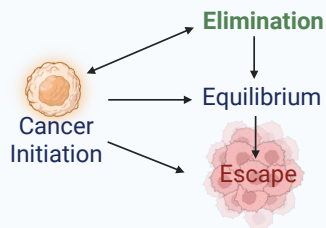
3. KEY IMMUNOLOGIC MECHANISMS IN PREVENTION

Immune Surveillance



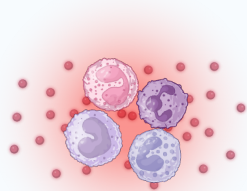
Detection and killing of transformed or stressed cells by innate and adaptive immune cells.

Immunoediting



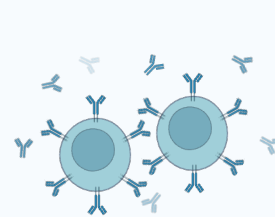
A dynamic process where the immune system eliminates cancer cells, keeps them in check, or allows escape.

Inflammation Control



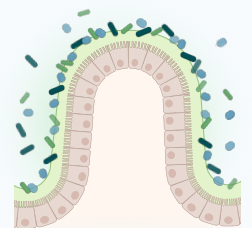
Chronic inflammation can promote cancer. Regulating cytokines and innate signals reduces risk.

Memory & Vaccination



Long-lived immune memory enables rapid response. Vaccines can establish protective memory.

Barrier Integrity



Maintaining physical barriers and a healthy microbiome reduces carcinogen entry and inflammation.

4. STRATEGIES FOR CANCER IMMUNOPREVENTION



Vaccines

Prophylactic vaccines (e.g. HPV, HBV) and experimental cancer or neoantigen vaccines to prevent oncogenic infection or target early lesions.



Immune Modulators

Agents that enhance immune surveillance or reverse tolerance (e.g. TLR agonists, STING agonists, cytokines, immune checkpoints in high-risk settings).



Targeting Chronic Inflammation

NSAIDs, cytokine inhibitors, or lifestyle interventions to reduce cancer-promoting inflammation.



Microbiome Modulation

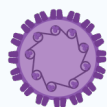
Probiotics, prebiotics, diet, and microbiota-targeted therapies to support immune homeostasis.



Lifestyle & Environmental Interventions

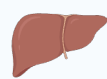
Exercise, healthy diet, weight control, smoking cessation, and reducing exposure to carcinogens.

5. EXAMPLES & EVIDENCE



HPV Vaccine

Highly effective in preventing HPV infection and related cancers (cervical, anal, oropharyngeal, etc.).



HBV Vaccine

Reduces chronic hepatitis B infection and the risk of hepatocellular carcinoma.



Aspirin/NSAIDs

Epidemiologic and clinical data support reduced risk of colorectal and other cancers with regular use (in appropriate populations).



Lifestyle Interventions

Physical activity, healthy diet, and smoking cessation lower cancer risk and inflammation.

6. CHALLENGES



Identifying high-risk individuals and the right timing for intervention.



Balancing potent immune activation with risk of autoimmunity or tissue damage.



Tumor heterogeneity and immune evasion mechanisms.



Need for biomarkers to predict response and long-term protection.

7. THE VISION: A CANCER-PREVENTIVE FUTURE



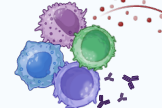
Risk Assessment
Genetics, infections, environment, lifestyle



Personalized Immunoprevention
Vaccines, immune modulators, lifestyle, microbiome



Early Detection & Monitoring
Biomarkers, imaging, immune profiling



Sustained Immune Surveillance
Prevent initiation, eliminate early lesions



Cancer Averted
Healthier lives, lower cancer burden



Cancer immunoprevention integrates basic science, translational research, and public health to stop cancer before it begins.



The best cancer is the one that never happens!



CIP-Net
Cancer Immunoprevention Network