DC Fusion Cell Immunotherapy ---Whole Tumor Antigen

A new therapeutic tumor immune cell therapy uses the patient's own tumor cells to fuse with dendritic cells to obtain whole tumor neoantigens.

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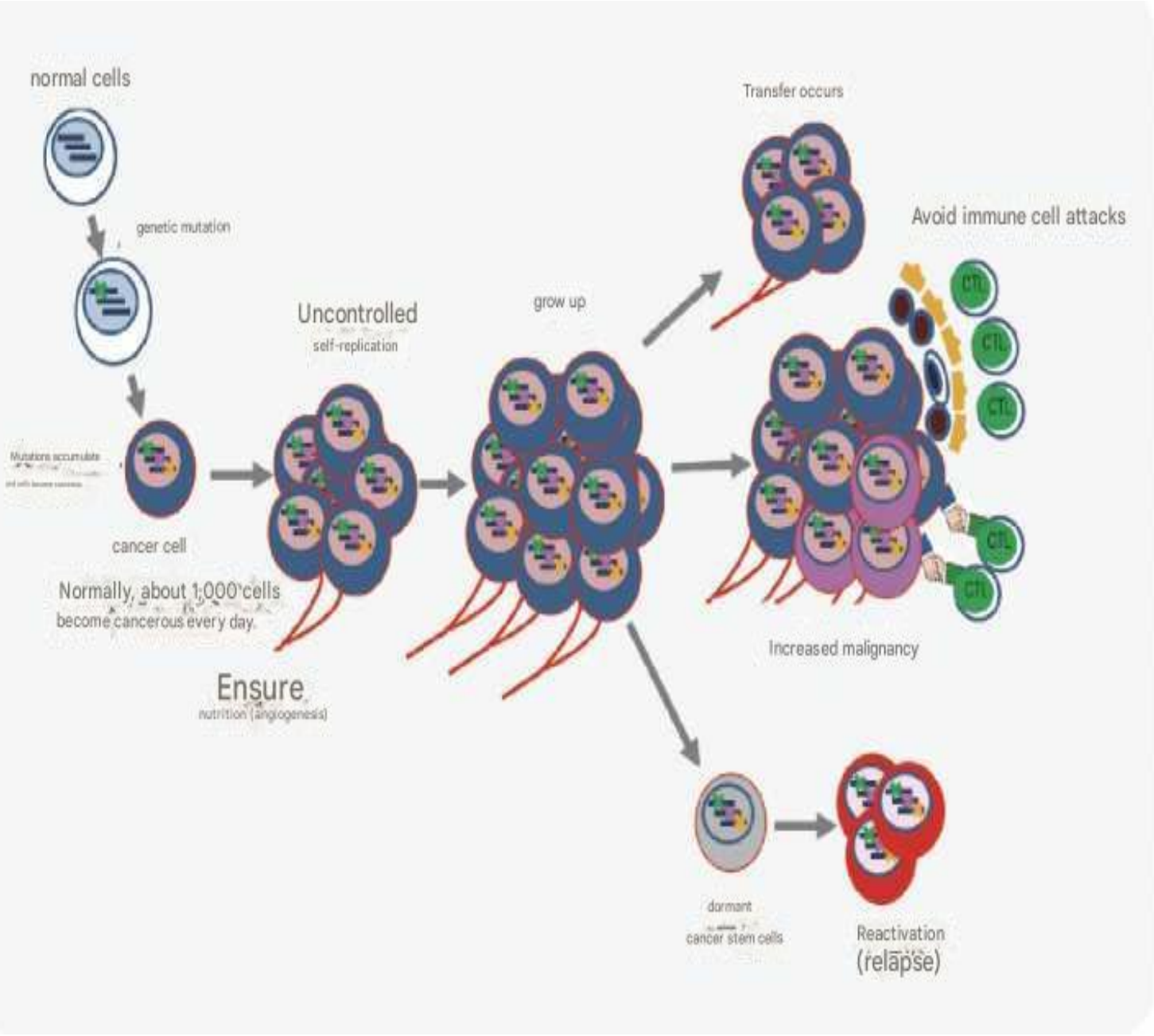
DC/TC-F12 Whole Tumor Antigen DC Fusion Cell Immunotherapy

Fusion Cell Therapy

Cancer cells → Lymphocytes fighting cancer → Killer T cells → Dendritic cells → Fusion cells

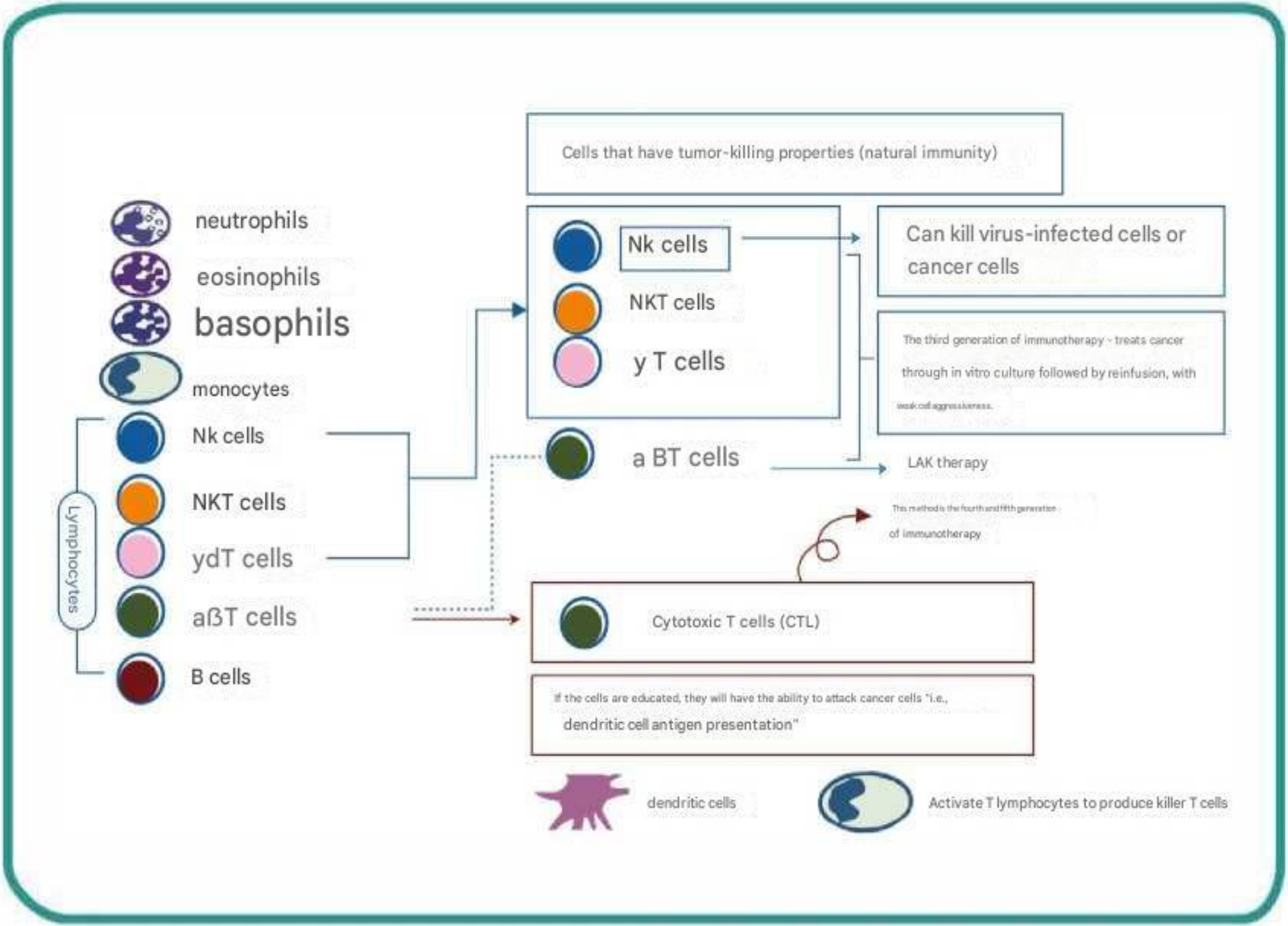
Cancer Formation and the Immune System



Cancer is caused by genetic mutations in body cells due to various reasons. Cancer survives by cleverly hiding from the body's immune system.

- Cancer is caused by gene mutations leading to uncontrolled cell replication, eventually forming cancer cells. Cancer cells survive by evading the immune system.
- Cellular immunotherapy has become a standard treatment option in Japan, alongside surgery, chemotherapy, and radiation therapy. In Europe and the US, immunotherapy is gaining attention as a new treatment approach.

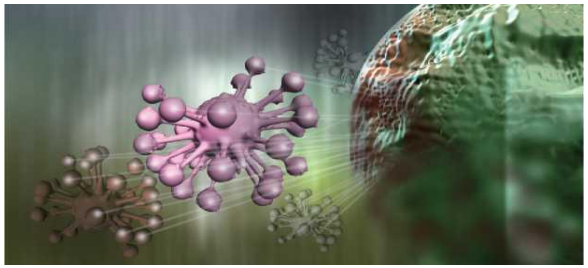
Components of the Immune System


Cells that have tumor-killing properties (natural immunity)
neutrophils
eosinophils
basophils
monocytes
Nk cells
NKT cells
ydT cells
aßT cells
B cells
Lymphocytes
Nk cells
NKT cells
y T cells
Can kill virus-infected cells or cancer cells
The third generation of immunotherapy - treats cancer through in vitro culture followed by reinfusion, with weak cell aggressiveness.
a BT cells
LAK therapy
This method is the fourth and fifth generation of immunotherapy
Cytotoxic T cells (CTL)
If the cells are educated, they will have the ability to attack cancer cells "i.e., dendritic cell antigen presentation"
dendritic cells
Activate T lymphocytes to produce killer T cells

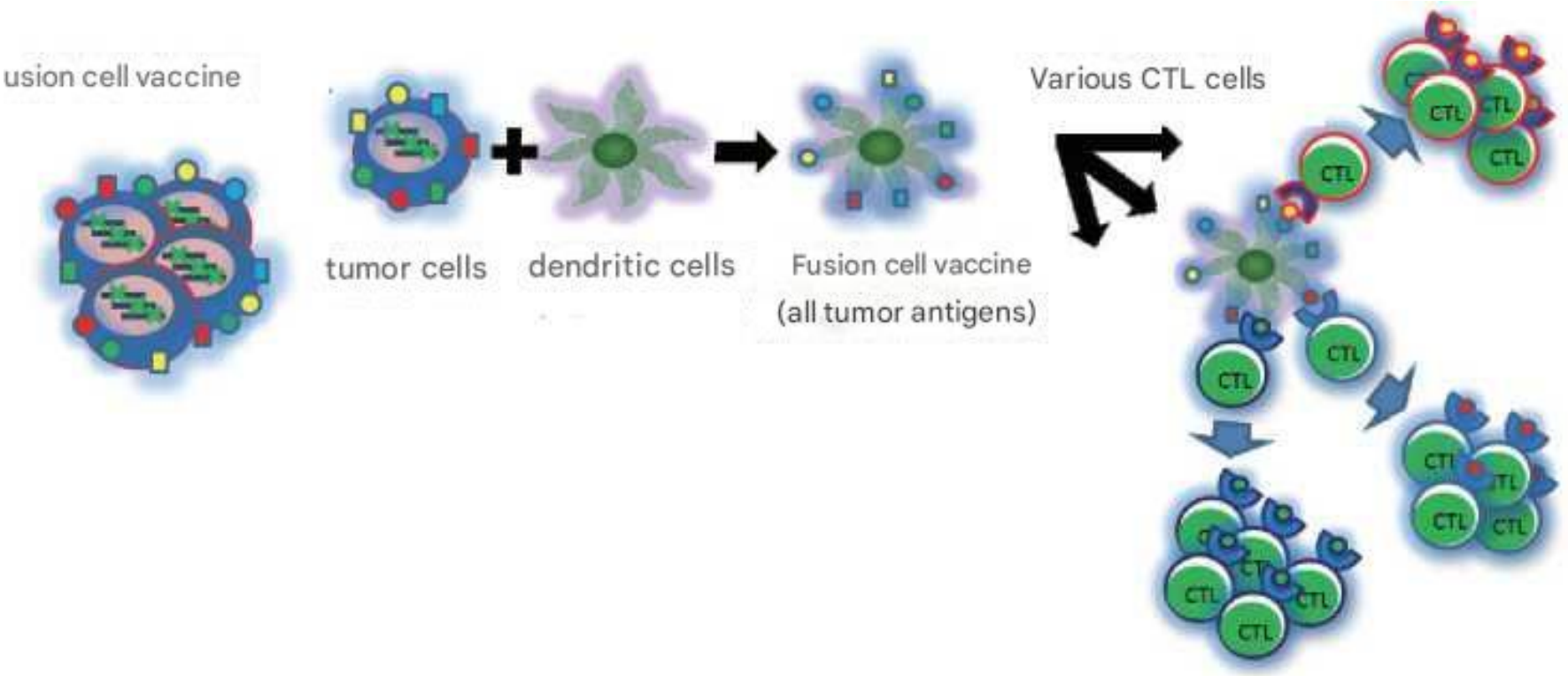
- The immune system consists of various lymphocytes, including neutrophils, eosinophils, basophils, monocytes, NK cells, NKT cells, γδT cells, αβT cells, and B cells.
- Cytotoxic T cells (CTLs) have the ability to specifically attack tumor cells. Dendritic cells activate T lymphocytes through antigen presentation, generating cytotoxic T cells.

Limitations of Traditional Dendritic Cell Vaccines

- Traditional dendritic cell vaccines use only one tumor antigen to stimulate cytotoxic T cells. If the target tumor does not express this antigen, the vaccine is ineffective.
- Tumor antigens may be hidden through processes like glycosylation, known as "antigen masking," preventing immune cells from effectively recognizing and killing tumor cells.



Advantages of Fusion Cell Vaccines



- By fusing tumor cells with dendritic cells, fusion cell vaccines can present multiple tumor antigens, activating a variety of cytotoxic T cells and enhancing the immune system's anti-tumor response.

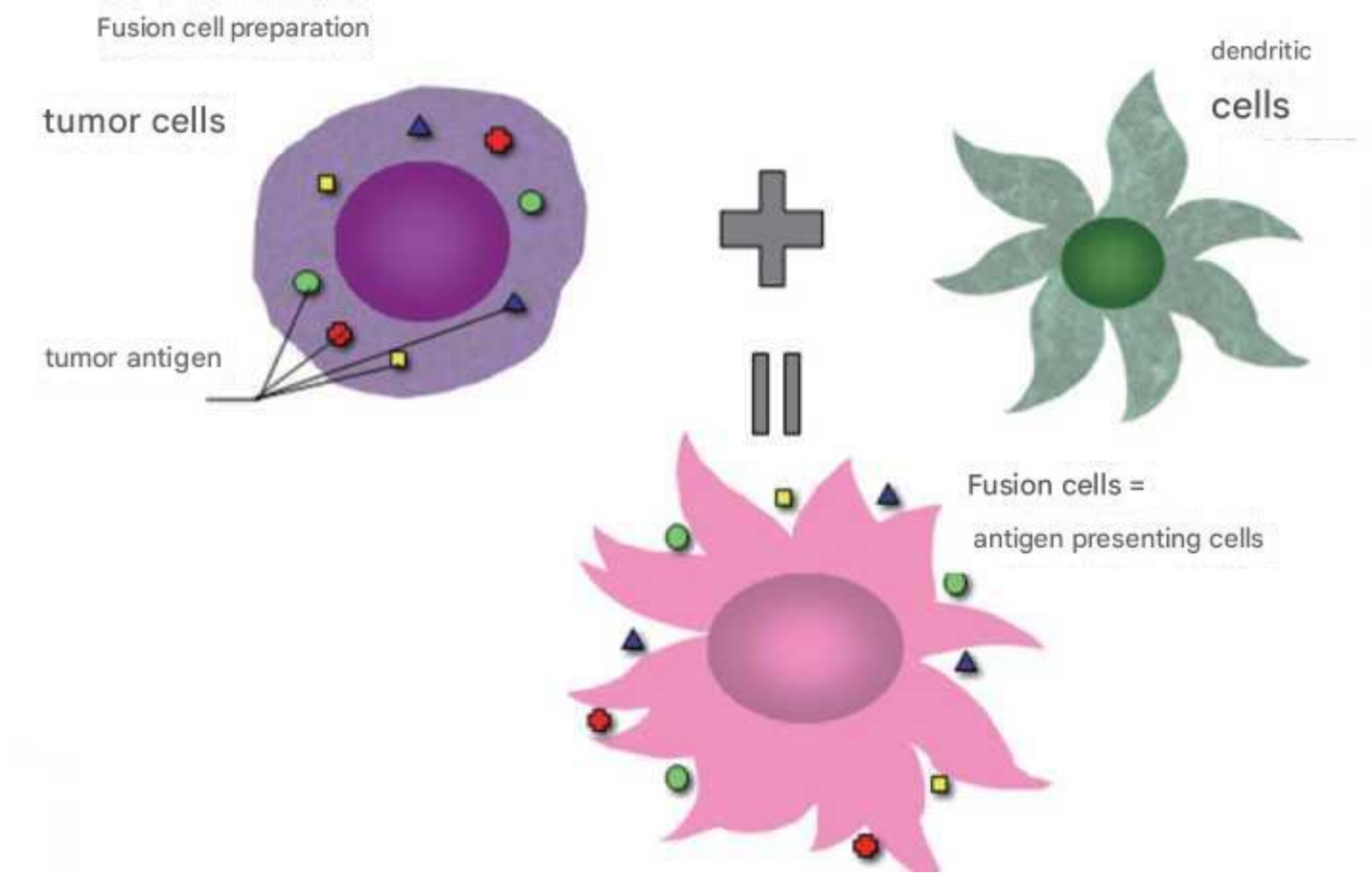
Fusion Cell Preparation Process

1. Fusion Cell Preparation: Tumor cells are fused with dendritic cells to form fusion cells.

2. Fusion Cell Injection: Fusion cells are injected subcutaneously near the lymph nodes and enter the lymph nodes.

3. Activation of Cytotoxic T Cells: Fusion cells stimulate the production of cytotoxic T cells, which travel through the bloodstream to attack tumor cells.

Characteristics of Fusion Cells



1. Fusion cells are the most advanced dendritic cell vaccines.

2. They contain all the immune antigen markers of tumor cells, enabling the education of cytotoxic T cells to treat tumors.

3. When used in combination with IL-12, they can enhance the effectiveness of immunotherapy.

dendritic cells

Cell fusion for 1 hour

2 hours later

fused cells

tumor cells

4 hours later

① Inject fusion cells and IL-12 subcutaneously near lymph nodes

cervical lymph nodes

axillary lymph nodes

Abdominal lymph nodes

Inguinal lymph nodes

★ Fusion cells 0.5mL

★ IL-12 0. 3mL

② Fusion cells enter lymph nodes

③ Fusion cells stimulate the production of killer T cells

④ Stimulated killer T cells reach tumor tissues through blood circulation and attack tumor cells

tumor cells

Target Population

1. Patients diagnosed with tumors.
2. Patients who have already started conventional treatments.
3. Patients who have completed treatment but are considering relapse prevention.
4. Patients who have not achieved good results with standard treatments or have experienced recurrence.
5. Patients for whom conventional treatments are ineffective.

Side Effects

Mild Side Effects:

1. Fever: Low-grade fever (around 37℃) lasting 1-2 days, with about 2% of patients experiencing temperatures above 38℃.
2. Fatigue: Fatigue may occur for 2-3 days after vaccination (frequency about 1%).
3. Pain and subcutaneous bleeding at the injection site: Pain may persist for 2-3 days, along with subcutaneous bleeding.

Treatment Process

1. Consultation: Patients provide past treatment records and diagnostic information.
2. Consent for Treatment: Patients sign a treatment consent form.
3. Initial Consultation and Blood Draw: Blood is drawn from the patient to prepare the fusion cell vaccine.
4. Vaccine Preparation: The preparation process takes 4-6 weeks from the arrival of the materials.
5. Treatment: On average, one vaccine is administered every two weeks, with a total of six vaccines per treatment course.

Case Studies

- Gastric Cancer Case 1: A 40-year-old male with stage IV multiple liver metastases experienced significant tumor shrinkage after combined fusion cell vaccine and anticancer drug therapy, with minimal side effects.
- Gastric Cancer Case 2: A 40-year-old male with recurrent gastric cancer showed gradual improvement in physical condition after combined fusion cell vaccine and anticancer drug therapy.
- Gastric Cancer Case 3: A 50-year-old male with peritoneal metastases experienced near-complete resolution of ascites after fusion cell vaccine therapy, with minimal side effects from anticancer drugs.
- Pancreatic Cancer Case 1: A 63-year-old male with pancreatic cancer remained stable after surgery and combined fusion cell vaccine and anticancer drug therapy.
- Pancreatic Cancer Case 2: A 70-year-old female with pancreatic cancer invading surrounding blood vessels showed no significant tumor growth after fusion cell vaccine therapy.
- Lung Cancer Case 1: A 60-year-old male with stage IV lung adenocarcinoma remained stable after combined fusion cell vaccine and PD-1 antibody therapy.
- Lung Cancer Case 2: A 40-year-old male with stage IV lymph node and adrenal metastases experienced a rapid decrease in tumor markers after combined fusion cell vaccine and anticancer drug therapy.
- Lung Cancer Case 3: A 60-year-old male with stage I lung cancer achieved near-complete tumor disappearance after combined radiation and fusion cell vaccine therapy.
- Lung Cancer Case 4: A patient with lymph node, adrenal, and lung metastases experienced calcification of lung cancer tissue and disappearance of adrenal tumors after fusion cell vaccine therapy.
- Breast Cancer Case 1: A 50-year-old female remained stable after breast cancer surgery and fusion cell vaccine therapy.

- Breast Cancer Case 2: A 50-year-old female remained in good health after breast cancer surgery and fusion cell vaccine therapy.
- Uterine Cancer Case 1: A 50-year-old female with stage IVb multiple lymph node metastases and peritoneal infiltration showed normal tumor markers after fusion cell vaccine therapy.
- Uterine Cancer Case 2: A 38-year-old female with stage Ib-2 uterine cancer showed significant improvement after fusion cell vaccine therapy.
- Undifferentiated Nasal/Sinus Cancer Case: A 50-year-old male with undifferentiated cancer experienced tumor shrinkage after fusion cell vaccine therapy.
- Tongue Cancer Case: A 40-year-old male with stage I tongue cancer showed significant improvement after combined fusion cell vaccine and anticancer drug therapy.
- Left Ovarian Cancer Case: A 70-year-old female with stage IIIA rectal metastases experienced a decrease in tumor markers after fusion cell vaccine therapy.
- Rectal Cancer Case: A 50-year-old male with stage IIIA rectal cancer remained stable after combined fusion cell vaccine and chemotherapy.
- Throat Cancer Case: A 60-year-old male with stage IIIb throat cancer experienced complete resolution of lesions after fusion cell vaccine therapy.
- Cancer of Unknown Primary Case: A 30-year-old male with multiple lymph node and bone metastases showed significant improvement after combined fusion cell vaccine and anticancer drug therapy.
- Bone and Soft Tissue Liposarcoma Case: A 50-year-old female experienced tumor shrinkage after fusion cell vaccine therapy.

Clinical Trial Results: Fused Cell Vaccine + IL-12 for Brain Tumors

(Jikei University School of Medicine Study - 15 Patients)

ID	Age/Sex	Pathological Diagnosis	Prior Treatments	KPS	8-Week Response	MRI Assessment
1	40/M	Glioblastoma multiforme	S+R+C	100	Stable	Partial response
2	64/F	Oligodendroglial tumor	S+R+C	70	Stable	Partial response
3	29/M	Anaplastic astrocytoma	S+R	100	Stable	Mixed response
4	60/M	Glioblastoma multiforme	S+R+C	90	Progressive	Progressive
5	40/F	Oligodendroglial tumor	S	100	Stable	Stable
6	55/F	Anaplastic astrocytoma	S+R+C	80	Progressive	Progressive
7	32/M	Glioblastoma multiforme	S+R+C	70	Stable	Stable
8	50/F	Anaplastic astrocytoma	S+R+C	70	Stable	Progressive
9	45/M	Anaplastic astrocytoma	S+R+C	100	Stable	Partial response
10	46/M	Glioblastoma multiforme	S+R+C	100	Progressive	Progressive
11	42/F	Glioblastoma multiforme	S+R+C	100	Stable	Progressive
12	55/M	Glioblastoma multiforme	S+R+C	90	Progressive	Progressive
13	56/F	Glioblastoma multiforme	S+R+C	90	Stable	Progressive
14	32/M	Anaplastic astrocytoma	S+R	100	Stable	Progressive
15	49/M	Anaplastic astrocytoma	S+R+C	100	Stable	Partial response

Key Findings:

- **73% stability rate** (11/15 patients showed halted progression at 8 weeks)
- Treatment protocol: Fused cell vaccine administered biweekly (6 total doses for non-progressive cases)

Abbreviations:
S = Surgery, R = Radiation, C = Chemotherapy
KPS = Karnofsky Performance Status

Conclusion

- DC/TC Fusion Cell Immunotherapy is an innovative cancer treatment that leverages the patient's own immune system to fight cancer. It offers personalized treatment with minimal side effects and significant efficacy, particularly for patients who have not responded to conventional treatments or have experienced recurrence.
- With further research, this therapy is expected to become an important tool in cancer treatment.