

JOHNS HOPKINS
M E D I C I N E

THE JOHNS HOPKINS HOSPITAL

Skin Cancer in Organ Transplant Patients

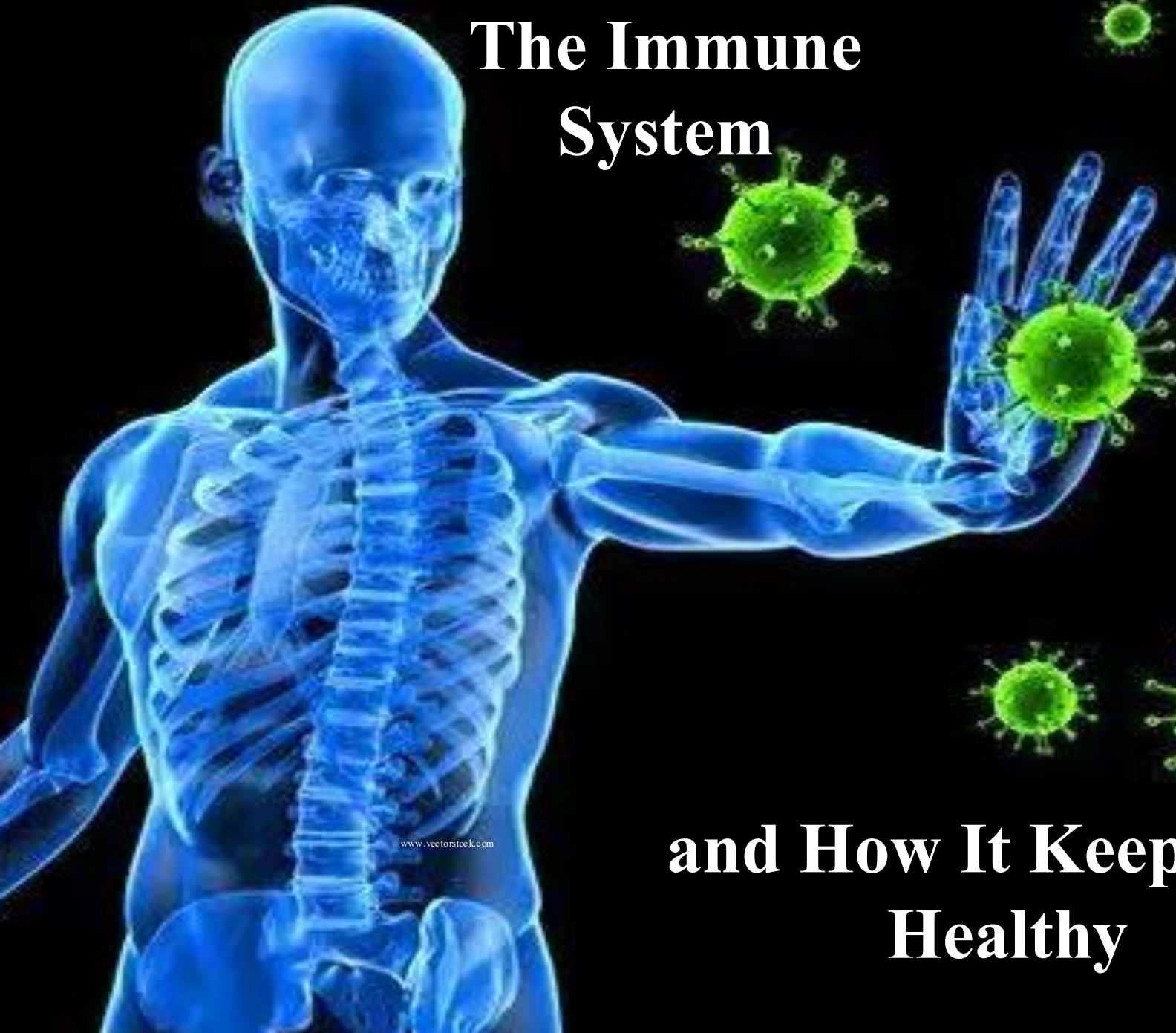
Jennifer G. Powers, MD

AGENDA

- The Immune System
- Your Medications
- Skin Infections
- Skin Cancer
- How to Stay Healthy



The Immune System



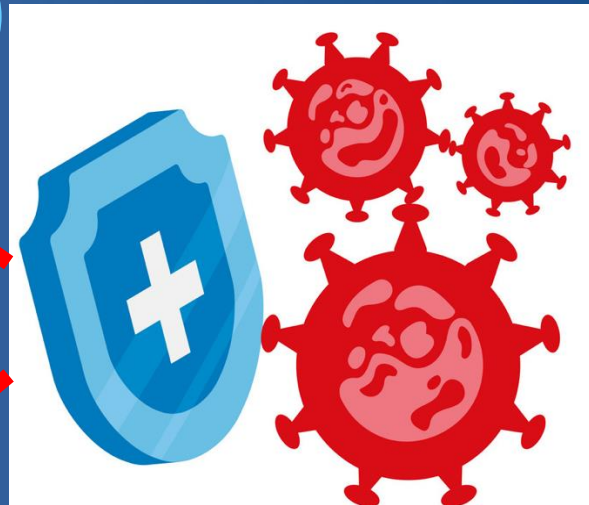
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**and How It Keeps You
Healthy**

The Immune System's Role in Keeping You Healthy

Fights disease-causing

germs: bacteria, viruses,
parasites or fungi



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Recognizes and neutralizes

harmful substances from
the environment

Fights disease-causing
changes in the body, such as

cancer cells

The Immune System's Role in Keeping You Healthy

Fights disease-causing
germs: bacteria,
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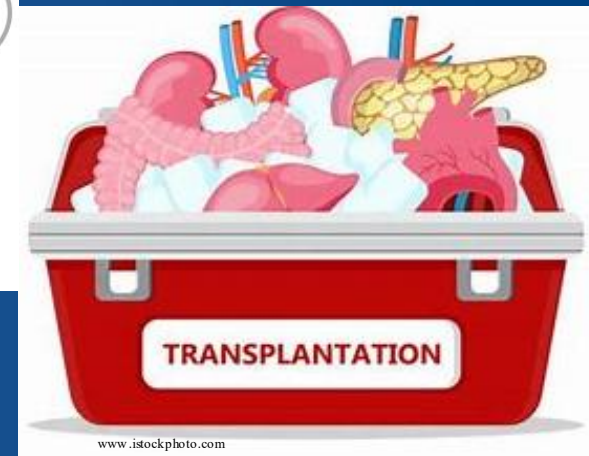
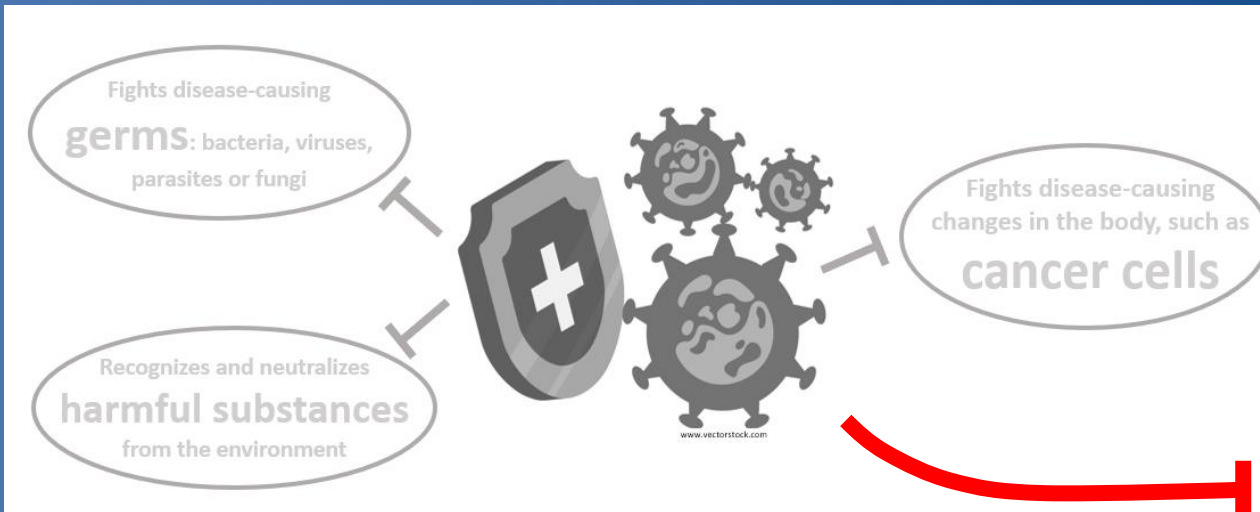


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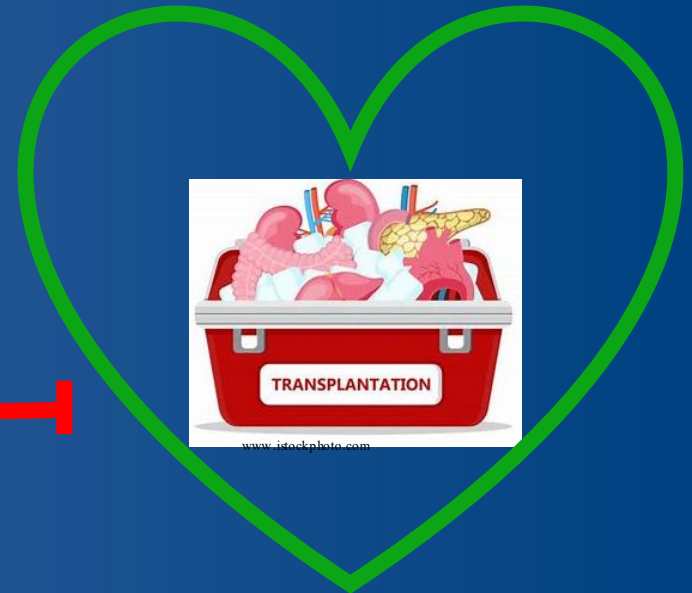
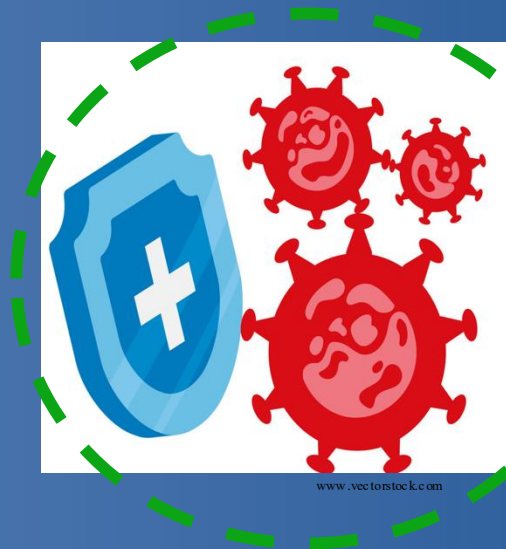
FOREIGN SUBSTANCES

The Immune System's Role in Keeping You Healthy



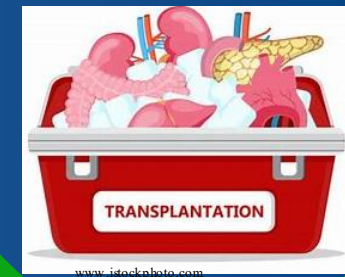
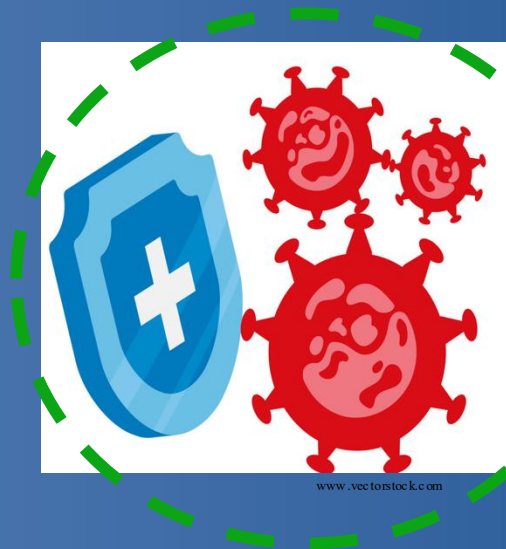
FOREIGN SUBSTANCES

The Immune System's Role in Keeping You Healthy



The Immune System's Role in Keeping You Healthy

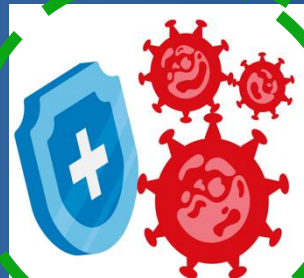
MEDICATIONS



The Immune System's Role in Keeping You Healthy

MEDICATIONS

Infections:
bacteria, viruses,
parasites or fungi



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The Immune System's Role in Keeping You Healthy

MEDICATIONS

Infections:
bacteria, viruses,
parasites or fungi



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**Cancer
cells**



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QUESTIONS?

Role of the Immune System in keeping You Healthy



Immunosuppressive Medications

Immunosuppressive Medications: Effects on the Skin

Systemic Steroids: prednisone

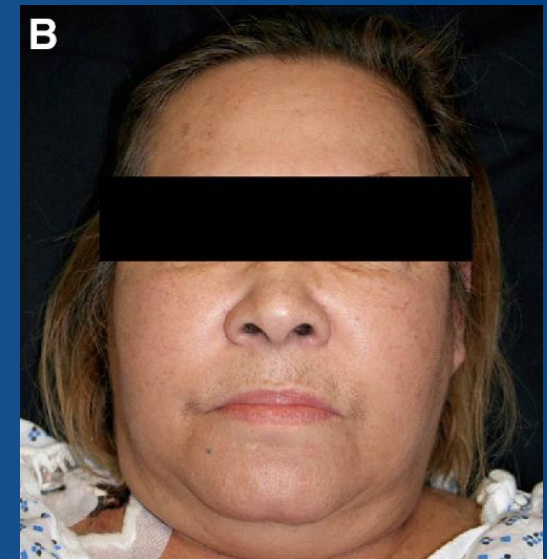
Stretch marks [striae]



Steroid acne



Cushing syndrome



Bruising [purpura]



Immunosuppressive Medications: Effects on the Skin

tacrolimus

Alopecia after simultaneous kidney-pancreas transplant



Immunosuppressive Medications: Effects on the Skin

tacrolimus

Alopecia after simultaneous kidney-pancreas transplant



Significant recovery after topical minoxidil



Immunosuppressive Medications: Effects on the Skin

mTOR inhibitors: sirolimus and everolimus

Palmar peeling



Acneiform eruption



Lower leg ulceration



Lower legs lymphedema





QUESTIONS?

Immunosuppressive Medications and Effects on the Skin

Skin Infections



Herpes zoster
(shingles)



wart



Molluscum



Exanthem

Immunosuppression Increases the Risk of Skin Infections

MEDICATIONS

Infections:
bacteria, viruses,
parasites or fungi

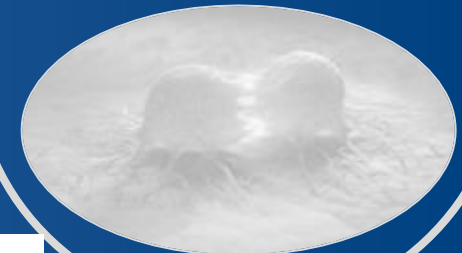


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Cancer cells



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Immunosuppression Increases the Risk of Skin Infections

Viral Infections

Warts are caused by HPV virus



Shingles [herpes zoster] is caused by varicella virus



Immunosuppression Increases the Risk of Skin Infections

Fungal Infections

Athlete's foot [Tinea pedis]



Ringworm [Tinea corporis]



QUESTIONS?

Skin Infections

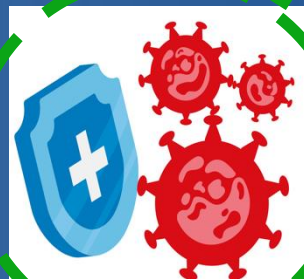
A microscopic image of skin tissue, likely a histological section stained with hematoxylin and eosin (H&E). The image shows a dense population of cells with prominent nuclei and a complex, interconnected network of fibers, characteristic of the dermal layer of skin. The overall appearance is a dense, purple and pinkish cellular structure.

SKIN CANCER
in
Organ Transplant Recipients

Immunosuppression Increases the Risk of Skin Cancer

MEDICATIONS

Infections:
bacteria, viruses,
parasites or fungi

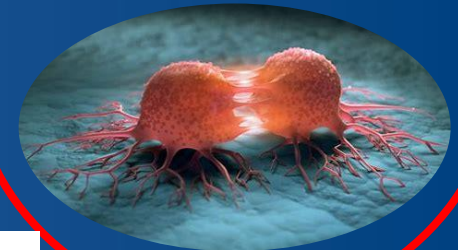


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Cancer cells



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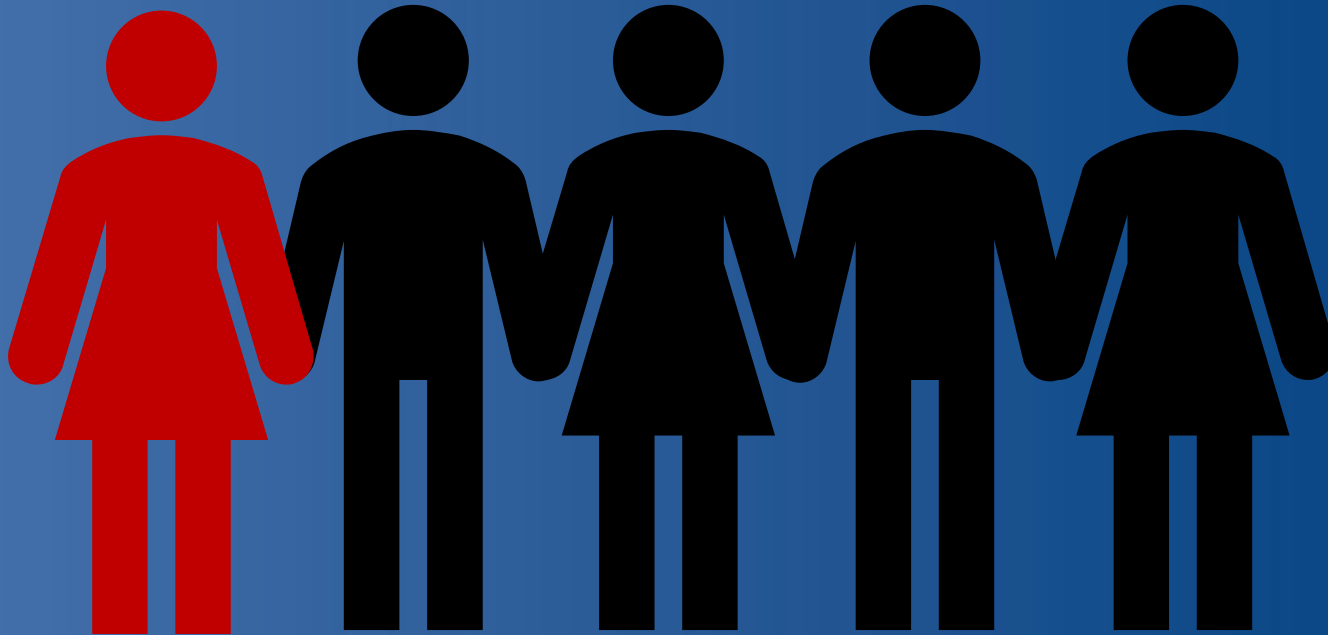
Skin Cancer In Organ Transplant Recipients

SKIN CANCER is the **MOST COMMON MALIGANCY**
after transplant

Compared to the general population,
CANCER is 2X more likely in
transplant recipients but
nonmelanoma skin cancer is **13X**
more likely

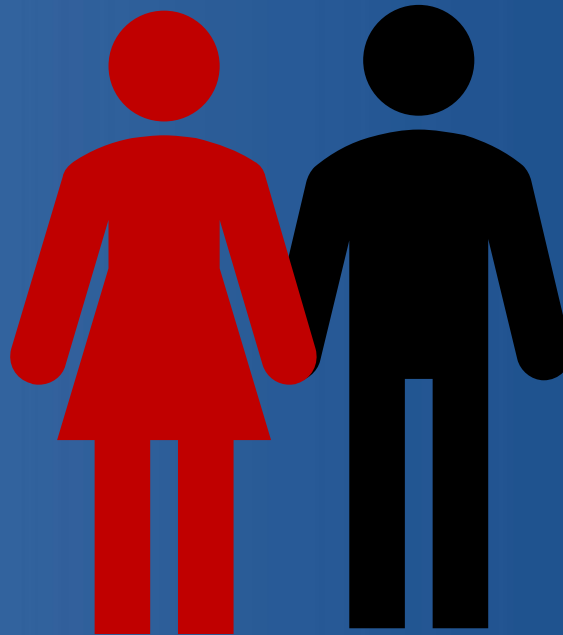
General U.S. Population: LIFETIME RISK OF SKIN CANCER

The Statistics: 1 in 5 70-year-olds born in the U.S. will develop a skin cancer during their lifetime



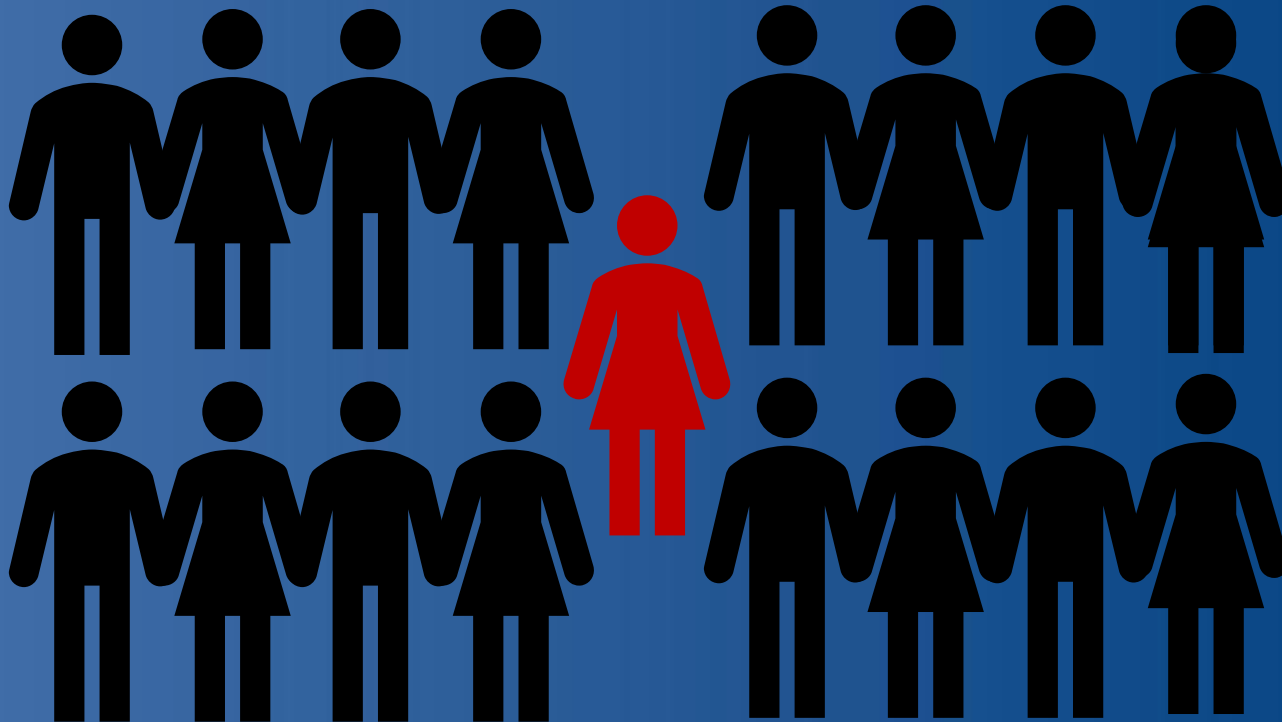
Transplant Population: LIFETIME RISK OF SKIN CANCER

50% of **white** transplant patients will develop skin cancer



Transplant Population: LIFETIME RISK OF SKIN CANCER

1 - 6% of **non-white** transplant patients will develop skin cancer



Transplant Population: LIFETIME RISK OF SKIN CANCER

1 - 6% of **non-white** transplant patients will develop skin cancer

However... **MORE LIKELY** to have:

- Less frequent dermatologic exams
 - Less skin cancer counseling
- Skin cancers more likely in sun-protected areas

Some SKIN CANCERS are OBVIOUS



Need to consult a physician is clear

Some SKIN CANCERS are *LESS OBVIOUS*



**Regular exams by a
dermatologist
increase the
probability of early
detection and
diagnosis**

Characteristics of Nonmelanoma Skin Cancer in Organ Transplant Recipients

- Occur average of 30 years earlier
- More frequently there are multiple skin cancers
- May have more rapid rate of growth
- Increased rate of recurrence
- Increased rate of metastasis

Who is at MOST Risk?

Factors unique to transplant patients

- **Age at transplantation** → older means higher risk
- **Time since transplantation** → longer means higher risk
- **Level of immunosuppression** → higher levels mean higher risk

Squamous Cell Carcinoma

Squamous
cell
carcinoma



65-250x
more common
in transplant
recipients

Actinic
keratoses



How to spot:

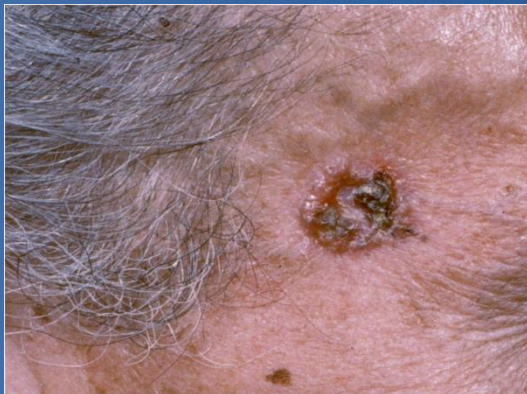
- Pink, scaly, waxy
- Sun-exposed areas
- May develop from pre-cancer “actinic keratoses”
- Pink, red, or brown spot with rough surface



Basal Cell Carcinoma



Basal cell carcinoma



10x
more common
in transplant
recipients

How to spot:

- Shiny pink bump or patch
- Sun-exposed areas
- May bleed or crust repeatedly
- Does not heal



Melanoma



4x
more common
in transplant
recipients

Melanoma

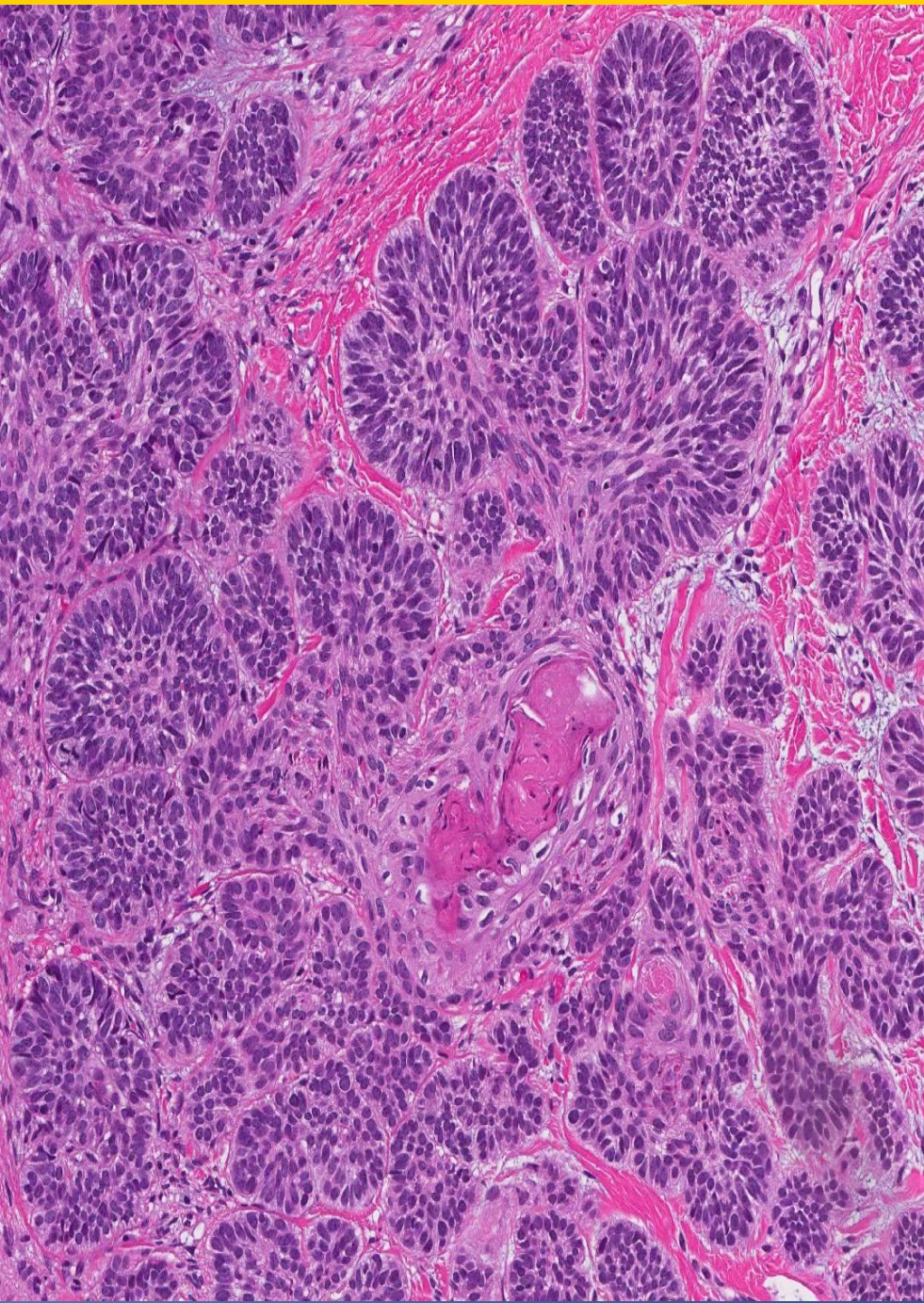
How to spot:

- Irregular brown spot
- ABCDE
- Changing mole



QUESTIONS?

Skin Cancer in Organ Transplant Recipients



What can YOU do to PREVENT SKIN CANCER?



What Causes Skin Cancer?

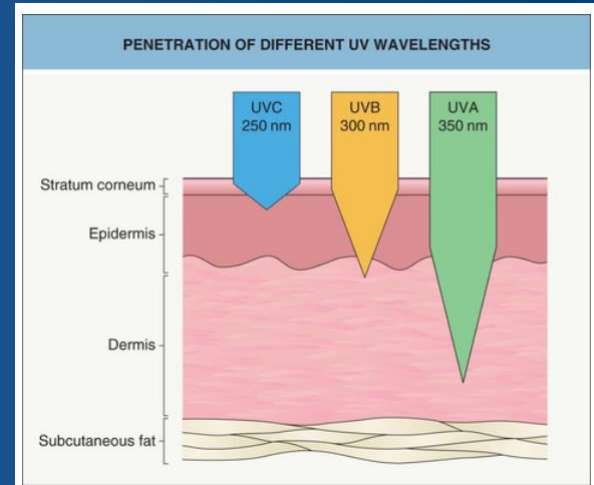
Ultraviolet Radiation

Ultraviolet A (UVA)

- Longest rays
- Passes through windows in your car and office
- Aging/wrinkle formation
- Cumulative risk skin cancer

Ultraviolet B (UVB)

- Shorter rays
- Sunburns
- UVB is responsible for the formation of most skin cancers



How to PREVENT Skin Cancer?

- **Before the transplant** be evaluated for possible skin cancers
- **Discuss** with your doctor your **risk** for skin cancer
- Be educated about **sun protection** and sun avoidance
- **Examine** your **skin** at least monthly
- See your **dermatologist** regularly for a skin exam
- Have any **precancers** or cancers **treated early**

How to PREVENT Skin Cancer?

- Before the transplant be evaluated for possible skin cancers

Aggressive sun protection is the best defense against skin cancer

- Have any precancers or cancers treated early

Sun Protection Basics

- Find a sunscreen you like
- Apply liberally - it takes 1 to 2 ounces to cover the body adequately (at least 1 teaspoon per body part)
- Apply 30 minutes before going out
- Repeat application after swimming, sweating
- Look for sunscreen in daily moisturizer and make-up if worried
- Make sunscreen a daily habit!
- UVB peaks from 10am-2pm
- Sand reflects 10-15% of UV radiation
- No tanning beds



Sun Protection Basics

- Find a sunscreen you like
- Apply liberally (about 1 ounce (28 grams) of sunscreen per body part)
- Apply 15 minutes before going outdoors
- Reapply every 2 hours, or more often if swimming or sweating
- Look for broad spectrum (UVA and UVB protection)
- Make sure the SPF is at least 30
- UVA rays are the most harmful
- Sand, water, and sweat can remove sunscreen
- No tanning beds

People apply only **25% to 50%** of the amount used in testing for SPF ratings



SUNSCREEN Basics



www.skincancer.org

SUNSCREEN Basics: HOW TO Read the Label

1. Broad Spectrum:
protection against both **UVA**
and **UVB**



SUNSCREEN Basics: HOW TO Read the Label

1. Broad Spectrum:
protection against both **UVA**
and **UVB**



2. Sun Protection Factor: how long a person can be in the sun before UVB rays start to burn the skin

SUNSCREEN Basics: HOW TO Read the Label

1. Broad Spectrum:
protection against both **UVA**
and **UVB**

3. Water/sweat-resistant:
sunscreen remains effective
for 40 or 80 min when
swimming or sweating



2. Sun Protection Factor: how long a person can be in the sun before UVB rays start to burn the skin

SUNSCREEN Basics: HOW TO Read the Label



1. Broad Spectrum:

protection against both **UVA** and **UVB**

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4. The Skin Cancer Foundation Seal of recommendation:

The daily use seal vs active seal

2. Sun Protection

Factor: how long a person can be in the sun before UVB rays start to burn the skin

SUNSCREEN Basics: HOW TO Read the Label



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**4. The Skin Cancer
Foundation Seal of
recommendation:** The daily use
seal vs active seal

**2. Sun Protection
Factor:** how long a person
can be in the sun before UVB
rays start to burn the skin

5. Active ingredients:
chemical and physical

SUNSCREEN Basics: Taking a Closer Look at the ACTIVE INGREDIENTS

Table 1

FDA-Approved Active Sunscreen Product Ingredients and Their Effects on UV Radiation

	Ingredient	UVA	UVB
Inorganic Agents	Titanium dioxide	I, II	X
	Zinc oxide	I, II	X
Organic Agents	p-aminobenzoic acid (PABA)		X
	Padimate-O		X
	Cinoxate		X
	Octinoxate		X
	Homosalate		X
	Octisalate		X
	Trolamine salicylate		X
	Oxybenzone	II	X
	Sulisobenzene	II	X
	Dioxybenzone	II	X
	Meradimate	II	
	Avobenzone	I	
	Octocrylene	II	X
	Ecamsule	I, II	X
	Ensulizole		X

I: protects against 340–400-nm UVA radiation; II: protects against 320–340-nm UVA radiation; X: protects against UVB radiation.

Source: References 1, 6, 11, 13.

Example label

Drug Facts	
Active ingredients	Purpose
Avobenzone 3% Homosalate 10% Octinoxate 7.5%	Sunscreen
Uses	
<ul style="list-style-type: none"> high UVB sunburn/UVA protection for skin highly sensitive to sunburn retains SPF after 80 minutes of activity in the water 	
Warnings	
For external use only	
UV exposure from the sun increases the risk of skin cancer, premature skin aging, and other skin damage. It is important to decrease UV exposure by limiting time in the sun, wearing protective clothing, and using a sunscreen.	
When using this product keep out of eyes. Rinse with water to remove.	
Stop use and ask a doctor if skin rash occurs	
Keep out of reach of children. If swallowed, get medical help or contact a Poison Control Center right away	
Directions	
<ul style="list-style-type: none"> apply liberally before sun exposure apply and reapply as directed to avoid lowering protection reapply after 80 minutes of swimming or sweating and after towel drying. Otherwise, reapply at least every 2 hours. children under 6 months: ask a doctor 	
Inactive ingredients alphabetical listing of ingredients	
Questions or comments? call toll free 1-800-XXX-XXXX	

SUNSCREEN Basics: Taking a Closer Look at the ACTIVE INGREDIENTS

Chemical ingredients

absorb UV like a sponge,
reducing penetration into the
skin

Table 1

FDA-Approved Active Sunscreen Product Ingredients and Their Effects on UV Radiation

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Inorganic Agents	Titanium dioxide	I, II	X
	Zinc oxide	I, II	X
Organic Agents	p-aminobenzoic acid (PABA)		X
	Padimate-O		X
	Cinoxate		X
	Octinoxate		X
	Homosalate		X
	Octisalate		X
	Trolamine salicylate		X
	Oxybenzone	II	X
	Sulisobenzone	II	X
	Dioxybenzone	II	X
	Meradimate	II	
	Avobenzone	I	
	Octocrylene	II	X
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I: protects against 340–400-nm UVA radiation; II: protects against 320–340-nm UVA radiation; X: protects against UVB radiation.
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Inactive ingredients alphabetical listing of ingredients	
Questions or comments? call toll free 1-800-XXX-XXXX	

SUNSCREEN Basics: Taking a Closer Look at the ACTIVE INGREDIENTS

Physical ingredients

deflect UV like a shield

Table 1

FDA-Approved Active Sunscreen Product Ingredients and Their Effects on UV Radiation

	Ingredient	UVA	UVB
Inorganic Agents	Titanium dioxide	I, II	X
	Zinc oxide	I, II	X
Organic Agents	p-aminobenzoic acid (PABA)		X
	Padimate-O		X
	Cinoxate		X
	Octinoxate		X
	Homosalate		X
	Octisalate		X
	Trolamine salicylate		X
	Oxybenzone	II	X
	Sulisobenzene	II	X
	Dioxybenzone	II	X
	Meradimate	II	
	Avobenzene	I	
	Octocrylene	II	X
	Ecamsule	I, II	X
Ensulizole		X	

I: protects against 340–400-nm UVA radiation; II: protects against 320–340-nm UVA radiation; X: protects against UVB radiation.

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Warnings	
For external use only	
UV exposure from the sun increases the risk of skin cancer, premature skin aging, and other skin damage. It is important to decrease UV exposure by limiting time in the sun, wearing protective clothing, and using a sunscreen.	
When using this product keep out of eyes. Rinse with water to remove.	
Stop use and ask a doctor if skin rash occurs	
Keep out of reach of children. If swallowed, get medical help or contact a Poison Control Center right away	
Directions	
<ul style="list-style-type: none"> apply liberally before sun exposure apply and reapply as directed to avoid lowering protection reapply after 80 minutes of swimming or sweating and after towel drying. Otherwise, reapply at least every 2 hours. children under 6 months: ask a doctor 	
Inactive ingredients alphabetical listing of ingredients	
Questions or comments? call toll free 1-800-XXX-XXXX	

SUNSCREEN Basics: Taking a Closer Look at the ACTIVE INGREDIENTS

Table 1

FDA-Approved Active Sunscreen Product Ingredients and Their Effects on UV Radiation

Example label

Drug Facts	Purpose
Active ingredients	
<p>Apply liberally to the face and skin to be protected. Reapply often, especially after swimming or sweating or toweling or drying the skin. Otherwise, reapply at least every 2 hours.</p> <ul style="list-style-type: none"> children under 6 months: ask a doctor 	
Inactive ingredients	alphabetical listing of ingredients
Questions or comments? call toll free 1-800-XXX-XXXX	

Physical

reflects
short

According to the FDA, only **ZINC OXIDE** and **TITANIUM DIOXIDE** ingredients of the “physical” or “mineral” sunscreens achieved **GRASE*** status

*Generally Recognized As Safe and Effective

Ensunazole	X
<p>I: protects against 340–400-nm UVA radiation; II: protects against 320–340-nm UVA radiation; X: protects against UVB radiation. Source: References 1, 6, 11, 13.</p>	

SUNSCREEN Examples

Mineral/Physical Sunscreens



Chemical Sunscreen



TINTED Sunscreens



SUNSCREEN Examples

Mineral/Physical Sunscreen

Chemical Sunscreen

TINTED Sunscreens

SUNSCREENS DO EXPIRE!



Innovations in Sun Protection

Oral Sun Protection!



Polypodium leucotomos extract (PLE), a natural antioxidant derived from a Central/South American fern, It works to protect the skin from UV radiation by reducing free radical damage, supporting the immune response, and mitigating sun damage

Sun-Protective Clothing

UPF= Ultraviolet Protection Factor, standard used to measure sunburn protection of fabrics

Advantages of UPF Clothing

- Once the garment is on – it's working, won't wear off
- Not messy, oily or greasy
- Non-allergenic
- Economical = lasts for multiple seasons



Men's LumaLeo Long Sleeve T-Shirt UPF 50+



Sun-Protective Clothing

UPF= Ultraviolet Protection Factor, standard used to measure sunburn protection

Advantages of UPF Clothing

- O
- W
- N
- N
- Economical = lasts for multiple seasons

Favorite worn-in white t-shirt
See-through fabric



Men's LumaLeo Long Sleeve T-Shirt UPF 50+



Sun-Protective Clothing

UPF= Ultraviolet Protection Factor, standard used to measure sunburn protection of fabrics

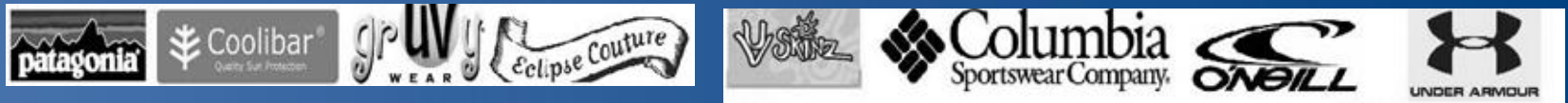
Advantages of UPF Clothing

- On average, 10% of people wear sun-protective clothing
- Most people wear white t-shirts
- Not all white t-shirts are created equal
- Not all white t-shirts are made of the same fabric
- Economical = lasts for multiple seasons

Favorite white t-shirt
See-through fabric



Men's LumaLeo Long Sleeve T-Shirt UPF 50+



STAYING SAFE IN THE SUN: REVIEW

Sun avoidance is the most effective way to protect your skin from the sun.

**Avoid peak hours
10am-2pm**

Sun-protective clothing provides immediate and long-lasting protection.

Sunscreens are an important component of sun protection.

- Spf 30+, broad-spectrum, water-resistant
- The best sunscreen is the one you will use!

SELF Skin Exams: HOW TO

Look for new/growing or changing bumps or moles, areas that bleed on their own or do not heal in 4 weeks

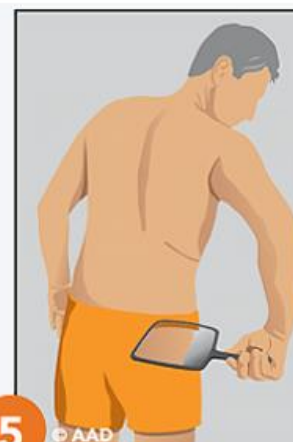
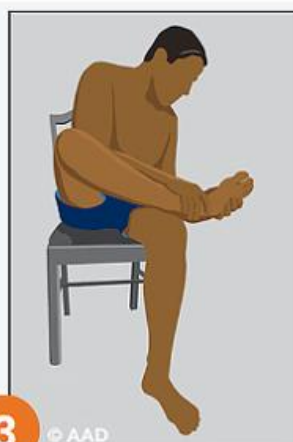
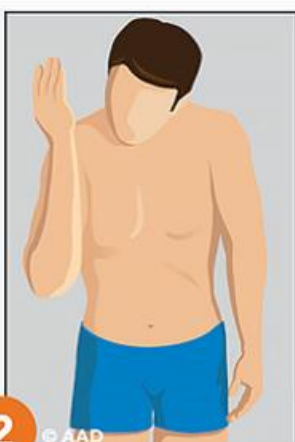
Examine your body in a full-length mirror

Look at your underarms, forearms and palms

Look at legs, between toes and soles of feet

Hand mirror helps to examine neck and scalp

Use hand mirror to check back and buttock



Do not forget the GENITAL AREAS!

Take Home MESSAGE

No one should DIE FROM a preventable SKIN CANCER!

Take Home MESSAGE

No one should DIE FROM a preventable SKIN CANCER!

**YOU can decrease your risk for skin
cancer: SUN PROTECTION**

Take Home MESSAGE

No one should DIE FROM a preventable SKIN CANCER!

YOU can decrease your risk for skin cancer: SUN PROTECTION

YOU can detect skin cancer before they are dangerous: SELF SKIN EXAMS

Acknowledgments



Medical Oncology Melanoma/ Skin Cancer Program

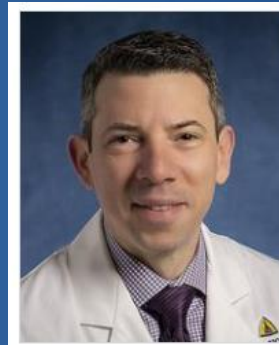
Question Support




Manisha Loss, M.D.



Kristin Bibee, M.D., Ph.D.



Evan Lipson, M.D.



Madeliene Stefanova Stump, MD, PhD
Instructor in Dermatology, Harvard Medical School
Dermatology
★★★★★
4.7 out of 5
(244 Ratings, 41 Comments)
[About Our Process](#)



Magdi Elghannam, BS