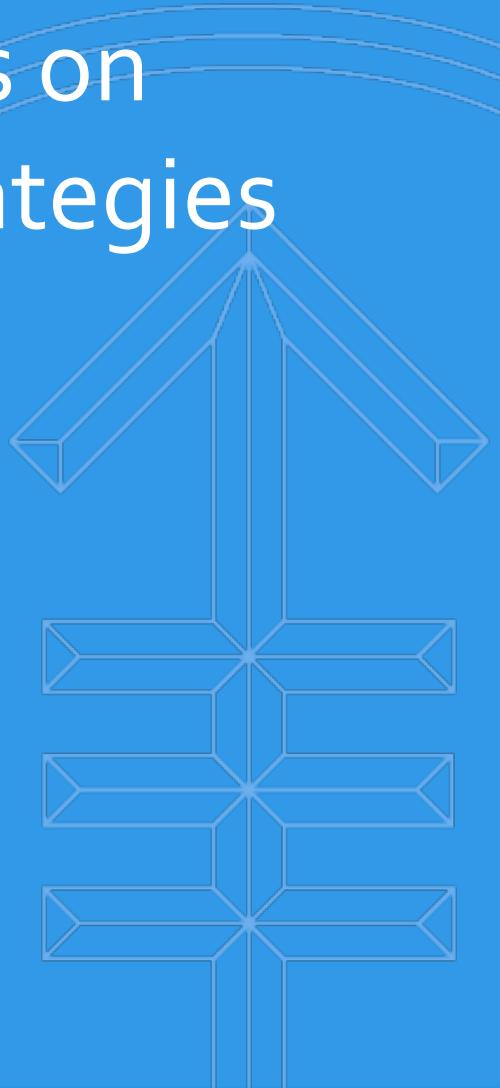




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Impact of Cancer Therapies on Hair and Management Strategies

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New York, NY



Disclosures

- Research funding
 - Berg, BMS, Genentech/Roche, RJR Fund, Galderma, Paxman, Novartis
- Consulting/Advisory
 - Legacy, Novartis, Janssen, BMS, Genentech/Roche, Galderma, Debio, Pfizer, Helsinn, Silk Therapeutics, Foamix, Boehringer Ingelheim, Medische Voet

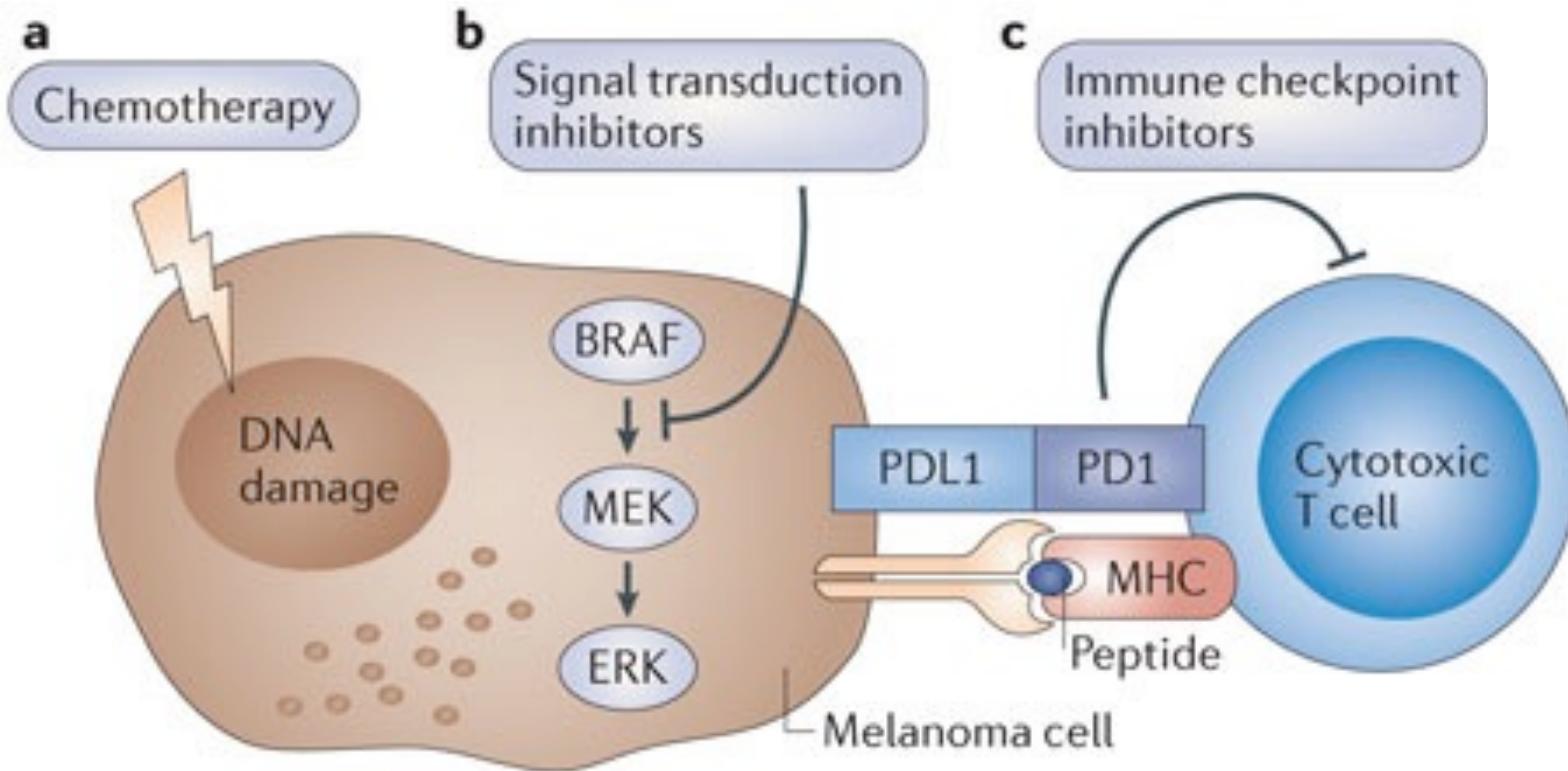


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Targeting Cancer

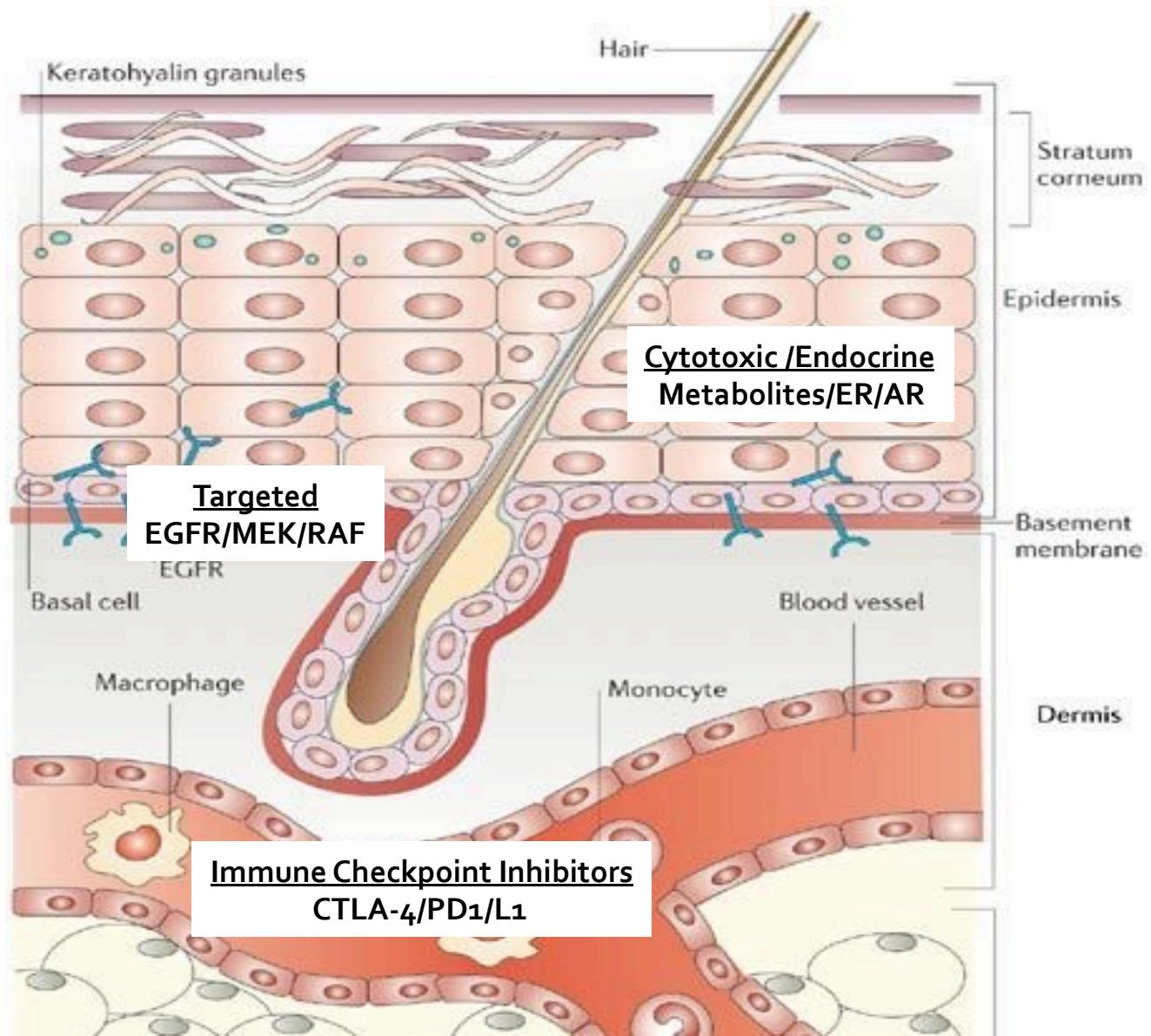
1.7 million in US; 14.1 million worldwide

65% - systemic therapy



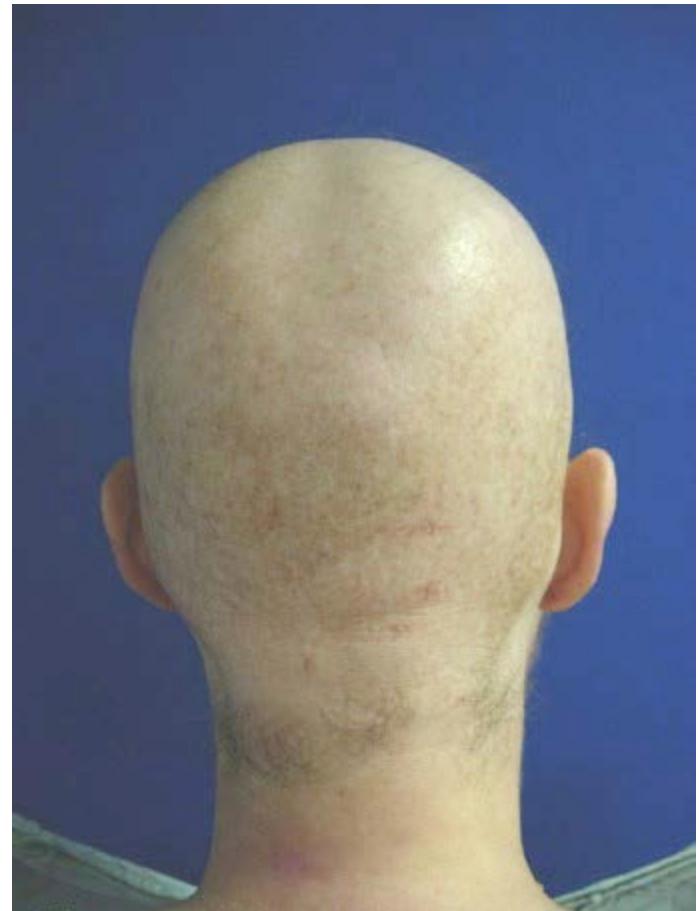
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And Targeting Hair



Chemotherapy-Induced Alopecia (CIA): Impact

- Incidence
 - Chemotherapy: 60-100%
 - Targeted therapies: 30-50%
 - Immunotherapies: 5%
- Psychosocial impact
 - 17% most traumatic AE (n=91)
 - 30% severely limited by alopecia
 - Discordance between patient, PRO and clinician
- Detrimental Treatment Choices
 - 14% would consider refusing curative therapy (n=217)



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CIA Prevention: Scalp Cooling Methods

Static

Penguin™



Elasto-Gel



Dynamic

Dignitana®



Paxman ®



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Association Between Use of a Scalp Cooling Device and Alopecia After Chemotherapy for Breast Cancer

Maximum Dean Score ^a	Hair Loss, %	Scalp Cooling Group (n = 101) ^b	
		No. of Patients	% (95% CI)
0	0	5	
1	>0-≤25	31	
2	>25-≤50	31	67% hair retention
3	>50-≤75	19	
4	>75	15	

Effect of a Scalp Cooling Device on Alopecia in Women Undergoing Chemotherapy for Breast Cancer

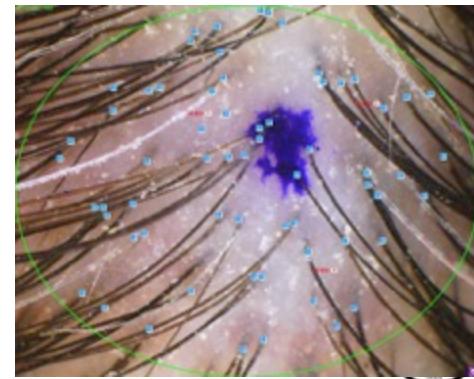
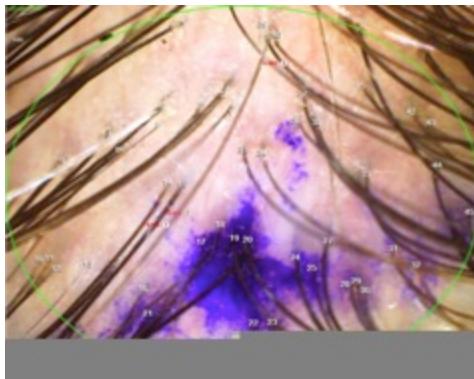
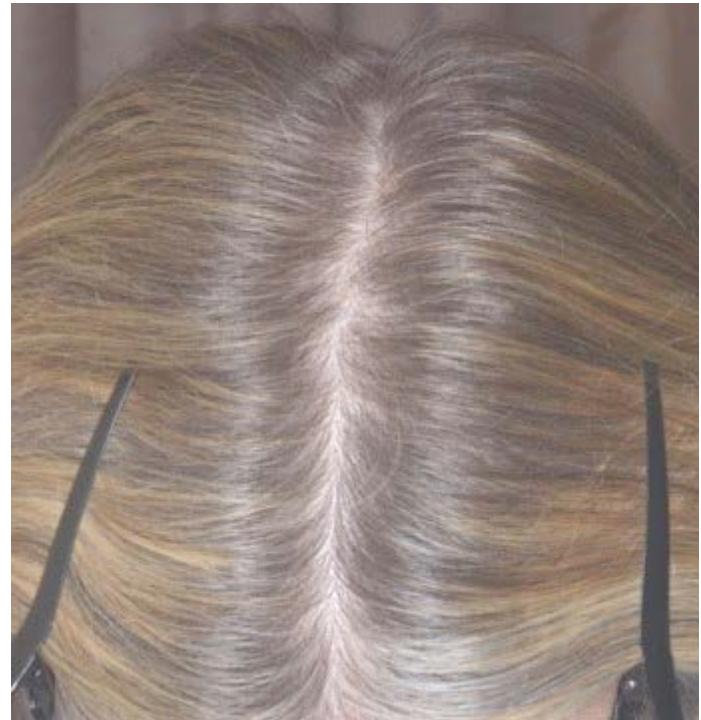
Parameter	Cooling (n = 95)	
	No.	% (95% CI)
Hair preservation ^b		
Success ^c	48	
Alopecia grade 0	5	
Alopecia grade 1	43	51% hair retention
Failure	47	

Scalp Cooling to Prevent CIA

Baseline



AC→Paclitaxel



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Permanent Chemotherapy-Induced Alopecia...

**Taxotere
Linked
to
Permanent
Hair Loss**



GREENBERG & BEDERMAN, LLC
TAXOTERE® HAIR LOSS LAWSUIT LAWYERS

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• No Risk, No-Obligation, Totally Free

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Did You Suffer Permanent Hair Loss After Chemotherapy?

Popular chemo drug Taxotere® has been linked to alopecia (permanent hair loss)...

Taxotere® (Docetaxel) is a "taxane" chemotherapy drug that is given intravenously for patients of...

- Breast cancer
- Non-small cell lung cancer
- Advanced stomach cancers
- Head and neck cancers
- ...and other serious cancers

FAILED TO WARN PATIENTS: Sanofi-Aventis™, the drug company behind Taxotere® is under allegations of negligence for having FAILED TO WARN patients and healthcare providers of the known risks of permanent hair loss (alopecia).



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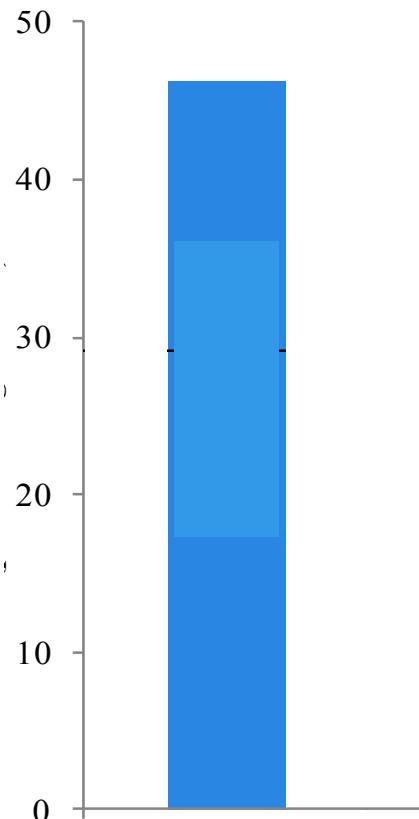
Persistent Chemotherapy-Induced Alopecia

- Alopecia lasting >6 mos post completion (n=98)
 - Paclitaxel: 39.5% (n=61)
 - Docetaxel: 6.3-15.8% (n=112- 134)

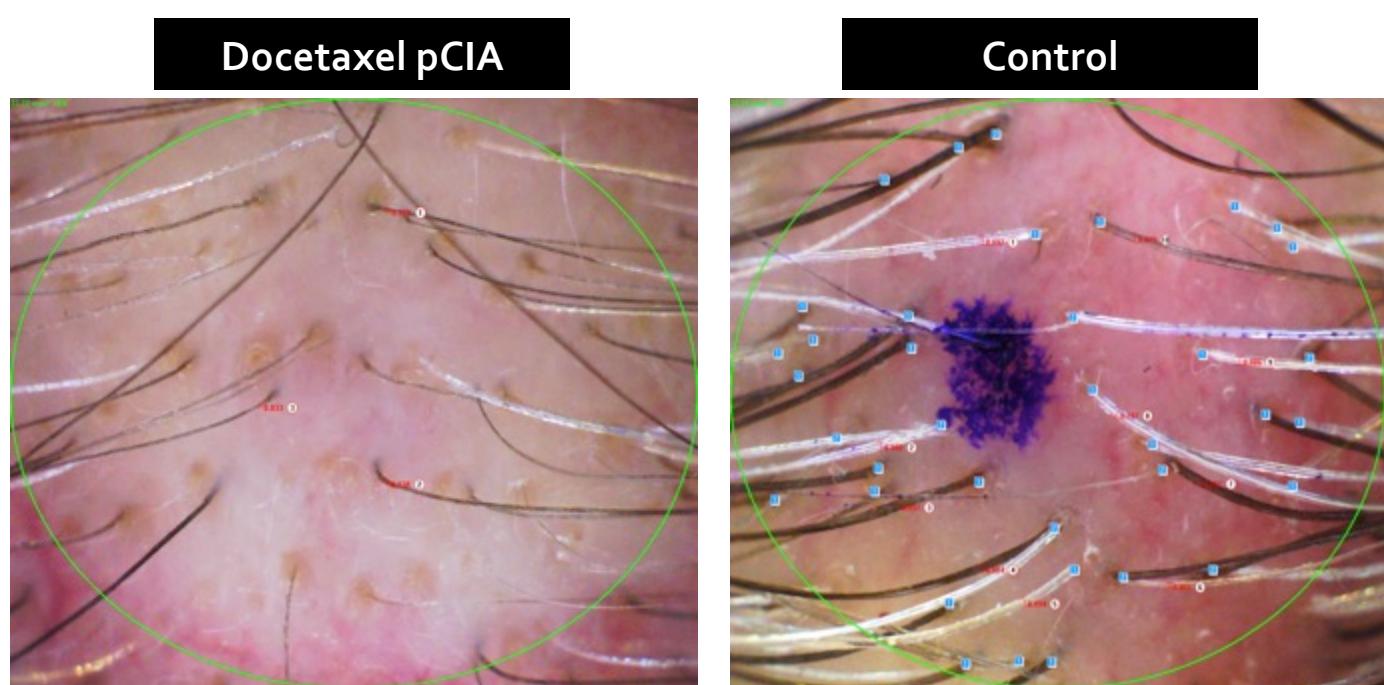


Persistent Chemotherapy-Induced Alopecia

**Impact on QoL
(n=94)**



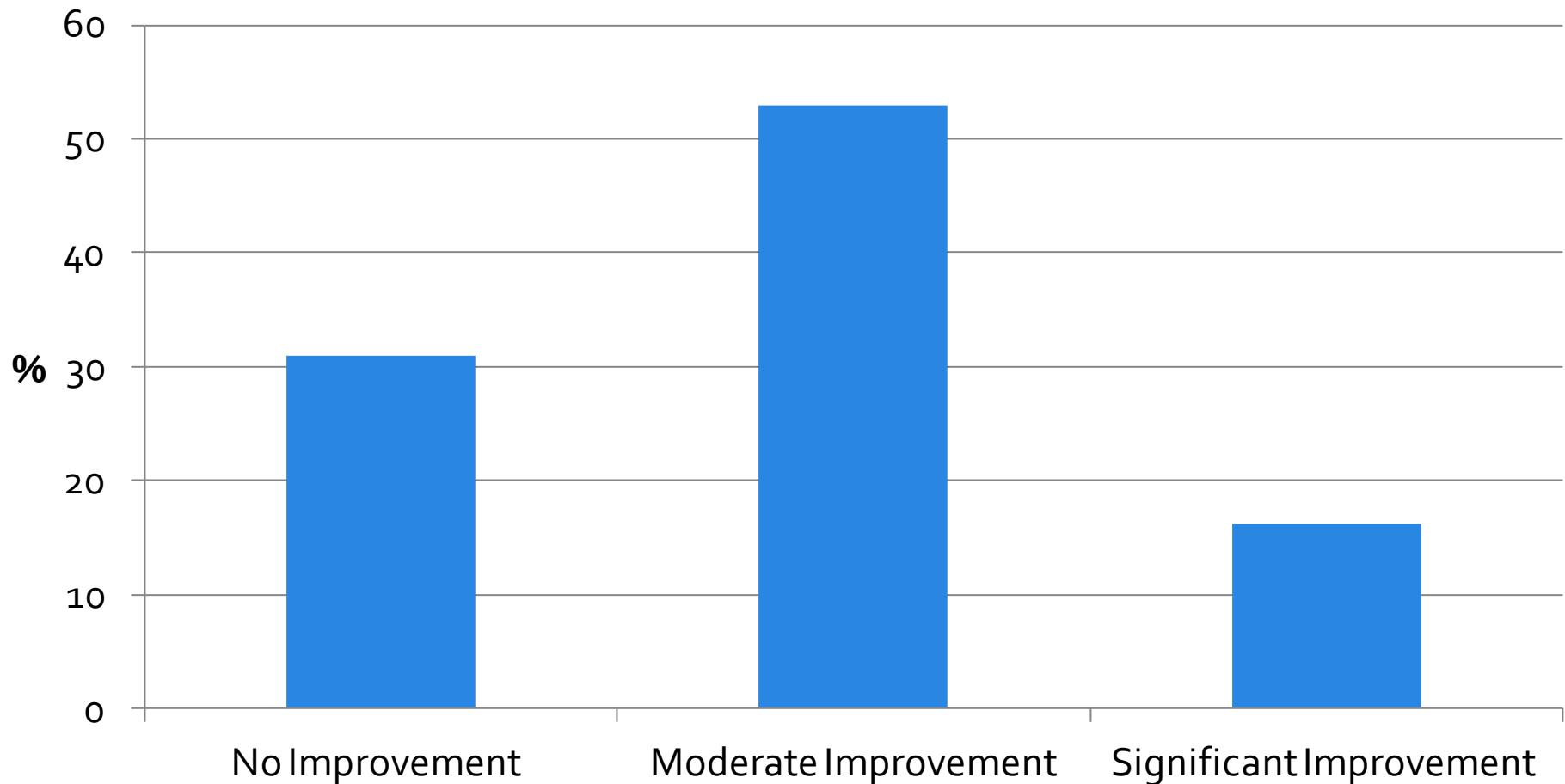
**Hair Shaft Density/Diameter
(n=82)**



pCIA Management-Clinical Outcome

Minoxidil ± Spironolactone

n=54



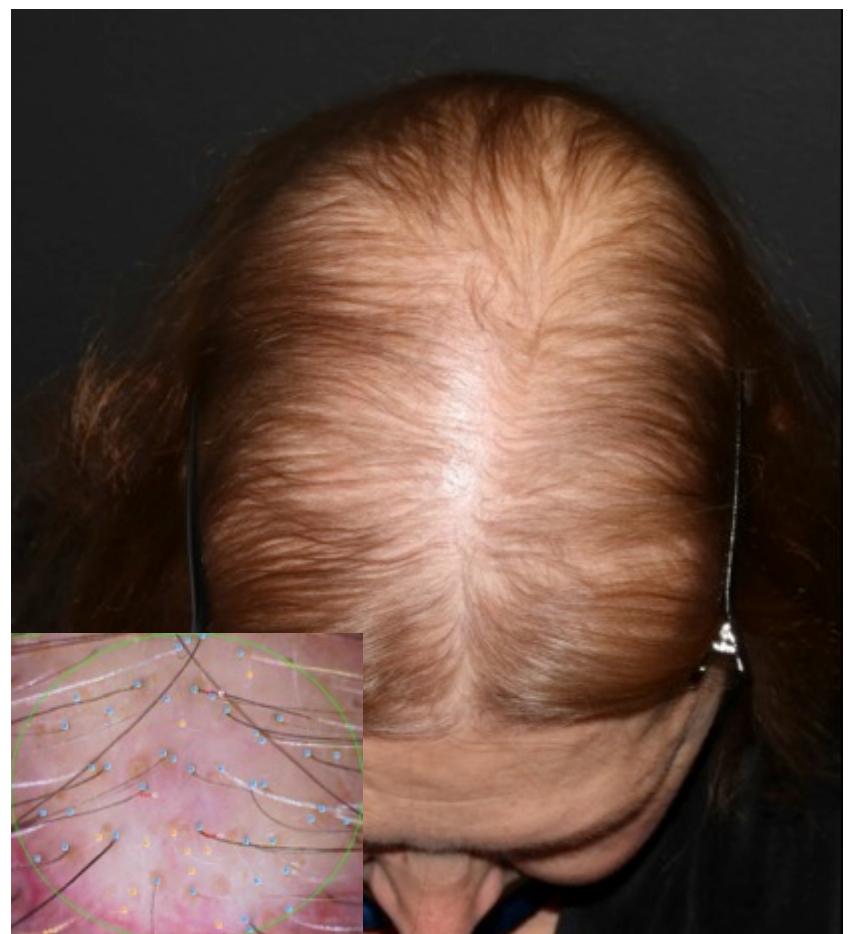
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pCIA Management-Clinical Outcome

Docetaxel, 56 y/o

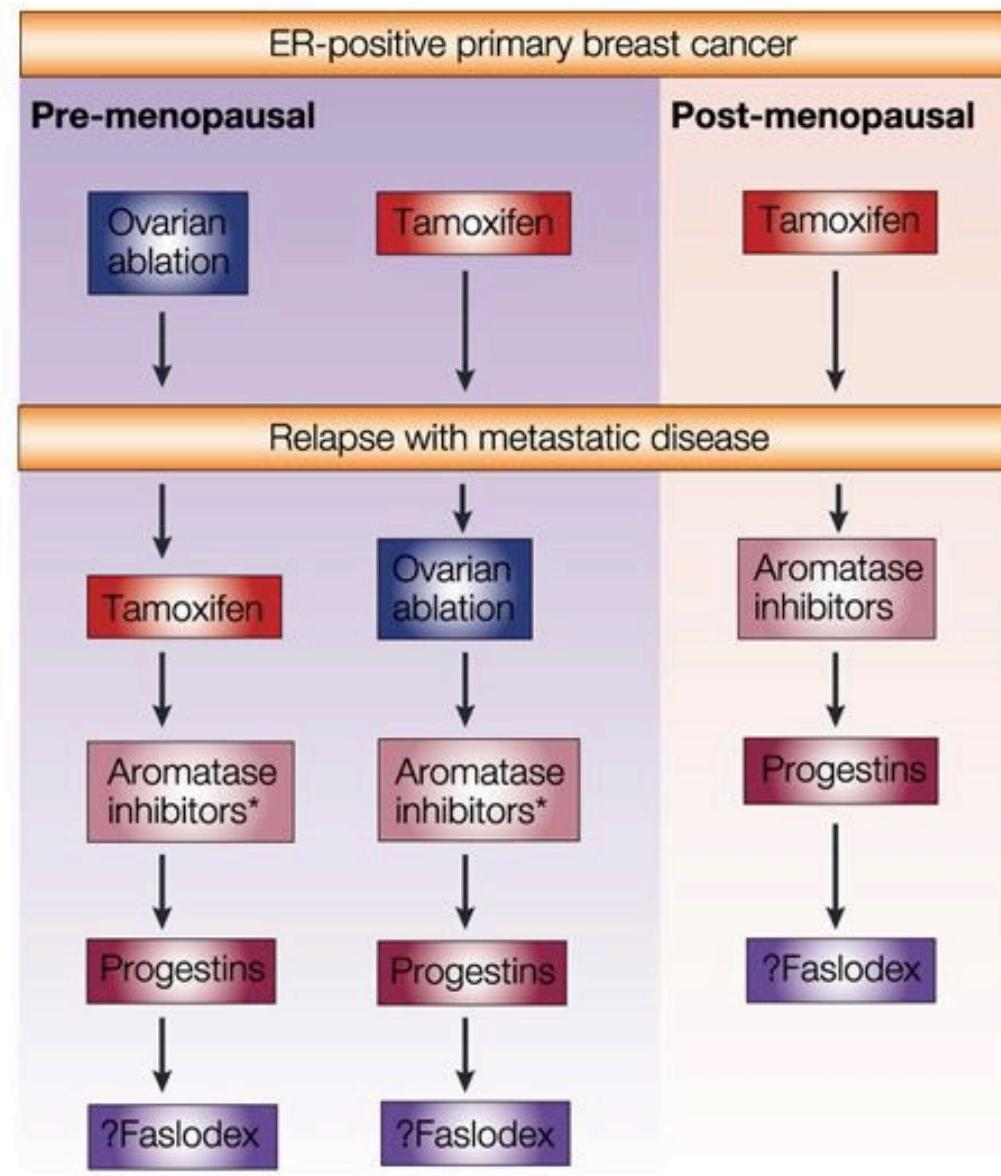


Tamoxifen + Minoxidil + PRP



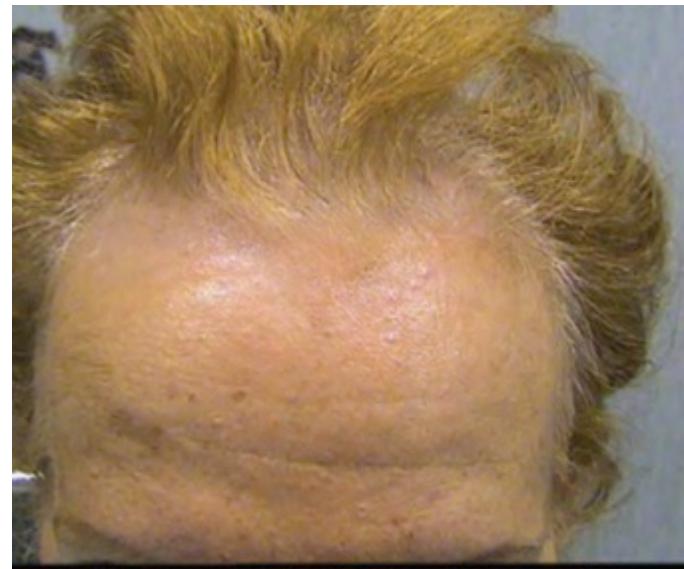
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Endocrine Therapy in Breast Cancer



Tamoxifen-Induced Total Alopecia

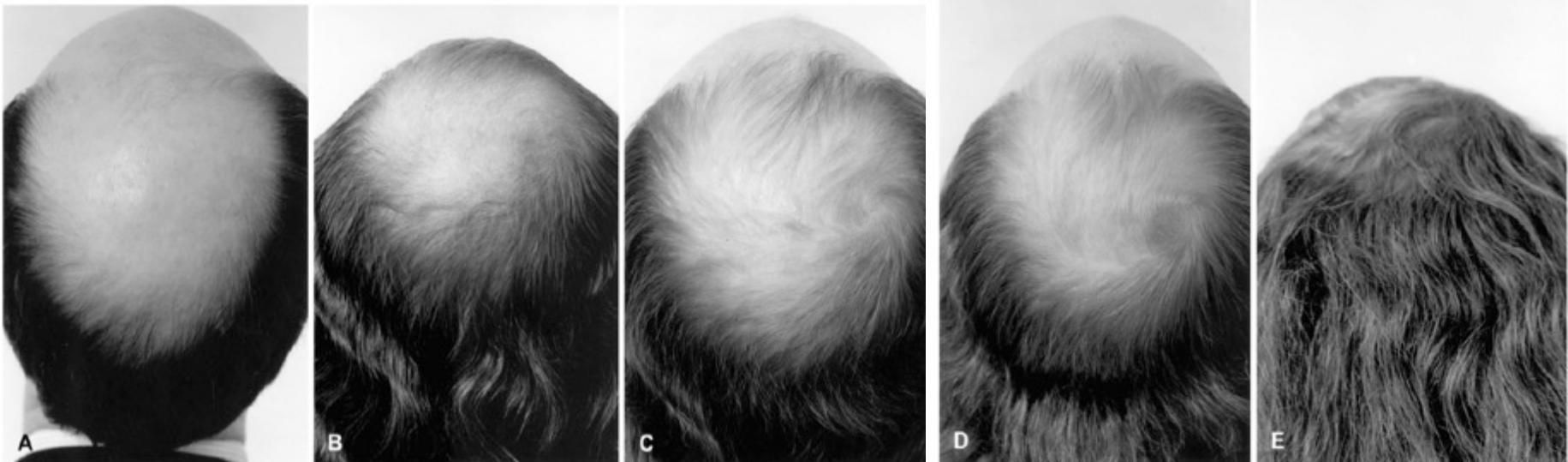
Aromatase inhibitors induce
'male pattern hair loss' in
women?



on Kettering

Estrogen (not Testosterone) is Good for Hair

Estradiol +
Spironolactone



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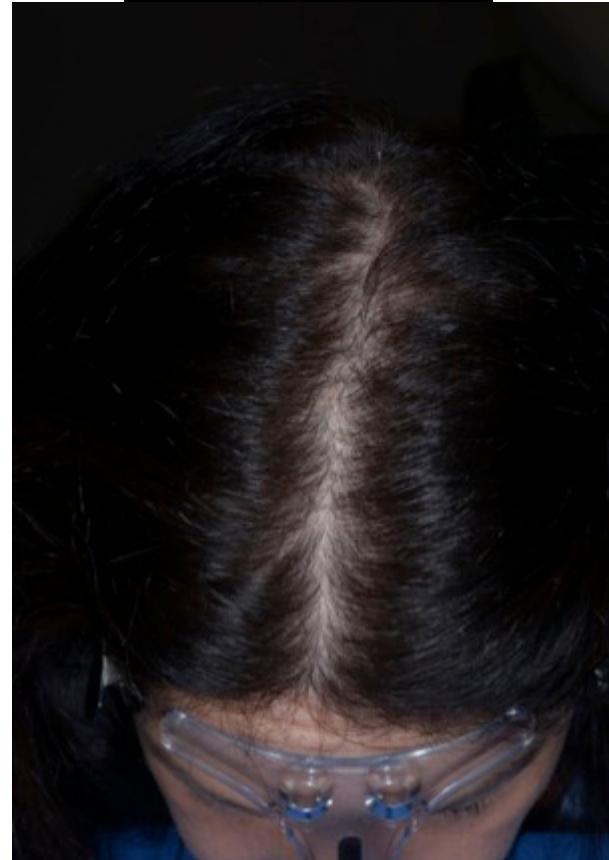
CHANCE: A Prospective, Longitudinal Study of Chemotherapy- Induced Hair, Skin And Nail Changes in Women with Breast Cancer

- That I will permanently lose my hair from chemotherapy or with hormones?
 - Primary endpoint: Incidence/severity of permanent CIA or HTIA



Study groups	Cohorts	Treatment Regimen	Individual Drugs
CYTOTOXIC CHEMOTHERAPY	I (n=100)	ddAC-T	Doxorubicin + Cyclophosphamide + Paclitaxel
	II (n=100)	CMF	Cyclophosphamide + MTX + 5-FU
	III (n=100)	Newer Combination Regimens	e.g. Taxane + Trastuzumab; Taxane+ Carboplatin + Trastuzumab; Taxane + Cyclophosphamide
ENDOCRINE THERAPY	IV (n=100)	Tamoxifen	Tamoxifen
	V (n=100)	Aromatase Inhibitor	e.g. Anastrozole, Letrozole, Exemestane
COMPARATOR (menopausal women)	VI (n=100)	NA	No treatment

Global alopecia



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CHANCE: A Prospective, Longitudinal Study of Chemotherapy- Hair, Skin And Nail Changes in Women with Breast Cancer

- That I will permanently lose my hair from chemotherapy or with hormones?
 - Primary endpoint: Incidence/severity of permanent CIA or HTIA

Therapy Init	Eval	Eval	Eval	Eval	Eval	Study end	Hair number/diameter
	Yr 0	Yr 1	Yr 2	Yr 3			
Study groups	Cohorts	Treatment Regimen	Individual Drugs				
CYTOTOXIC CHEMOTHERAPY	I (n=100)	ddAC-T	Doxorubicin + Cyclophosphamide + Paclitaxel				
	II (n=100)	CMF	Cyclophosphamide + MTX + 5-FU				
	III (n=100)	Newer Combination Regimens	e.g. Taxane + Trastuzumab; Taxane+ Carboplatin + Trastuzumab; Taxane + Cyclophosphamide				
ENDOCRINE THERAPY	IV (n=100)	Tamoxifen	Tamoxifen				
	V (n=100)	Aromatase Inhibitor	e.g. Anastrozole, Letrozole, Exemestane				
COMPARATOR (menopausal women)	VI (n=100)	NA	No treatment				



CHANCE study (Data cutoff December 2017)

Alopecia	Tamoxifen cohort N=21 (%)		Aromatase inhibitor cohort N= 20 (%)	
CTCAE v4.03	Baseline	Follow-up	Baseline	Follow-up
Grade 0 (no alopecia)	14 (66.7)	6 (28.6)	11 (55)	8 (40)
Grade 1 (<50% of hair loss)	7 (33.3)	15 (71.4)	7 (35)	11 (55)
Grade 2 (>50% of hair loss)	0	0	1 (5)	1 (5)
Trichoscopy data	Baseline	Follow-up	Baseline	Follow-up
Hair shaft N per cm ²	199 (36.51)	190.4 (33.49)	171.9 (45)	171.4 (51.9)
Hair thickness (microns)	70 (10)	70 (10)	70 (10)	70 (10)



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CHANCE study (Data cutoff December 2017)

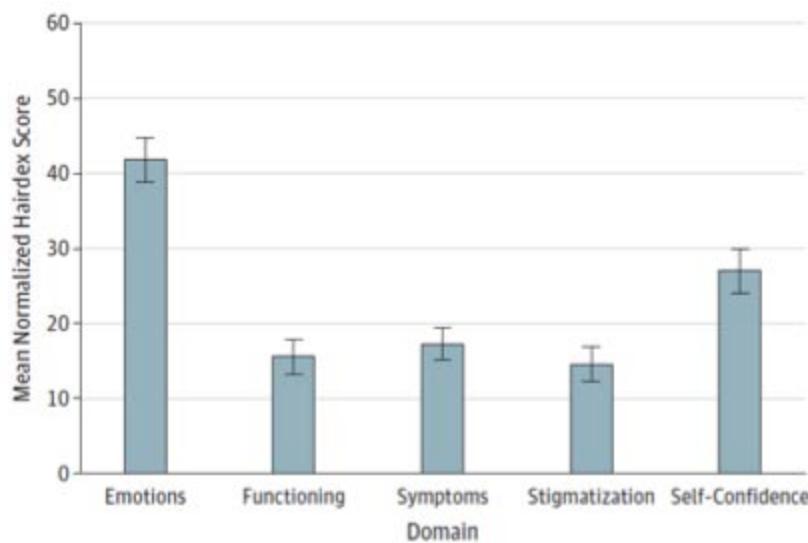
Skin disorders a year after follow-up	Tamoxifen cohort N=21 (%)	Aromatase inhibitor cohort N= 20 (%)
Eyelash alopecia (any grade)	3 (14.3)	2 (10)
Eyebrow alopecia (any grade)	2 (9.5)	2 (10)
Nail disorders*	Tamoxifen cohort N=17 (%)	Aromatase inhibitor cohort N= 16 (%)
Nail discoloration (Grade 1)	6 (35.3)	7 (43.8)
Nail ridging	8 (47)	10 (62.5)
Nail loss	0 (0)	0 (0)
Paronychia	0 (0)	0 (0)



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Endocrine Therapy-Induced Alopecia in Patients With Breast Cancer

Quality of Life
n=52



Hair Shaft Diameter
(n=82)

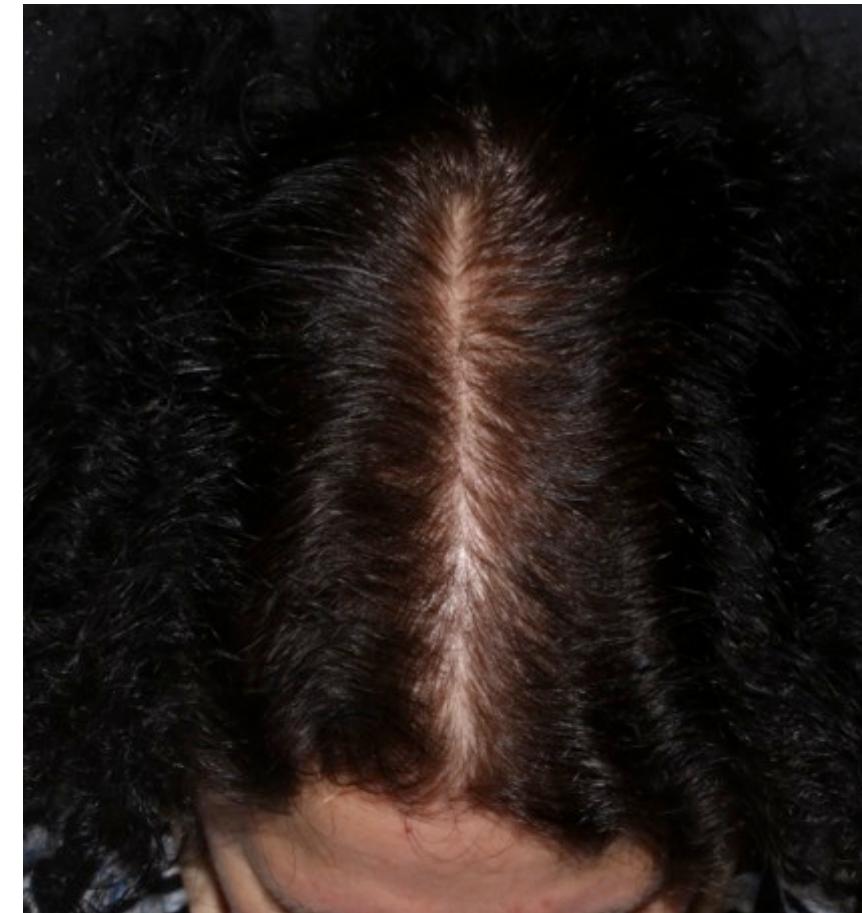


Endocrine Therapy-Induced Alopecia in Patients With Breast Cancer

Tamoxifen, 39 y/o



Tamoxifen + Minoxidil



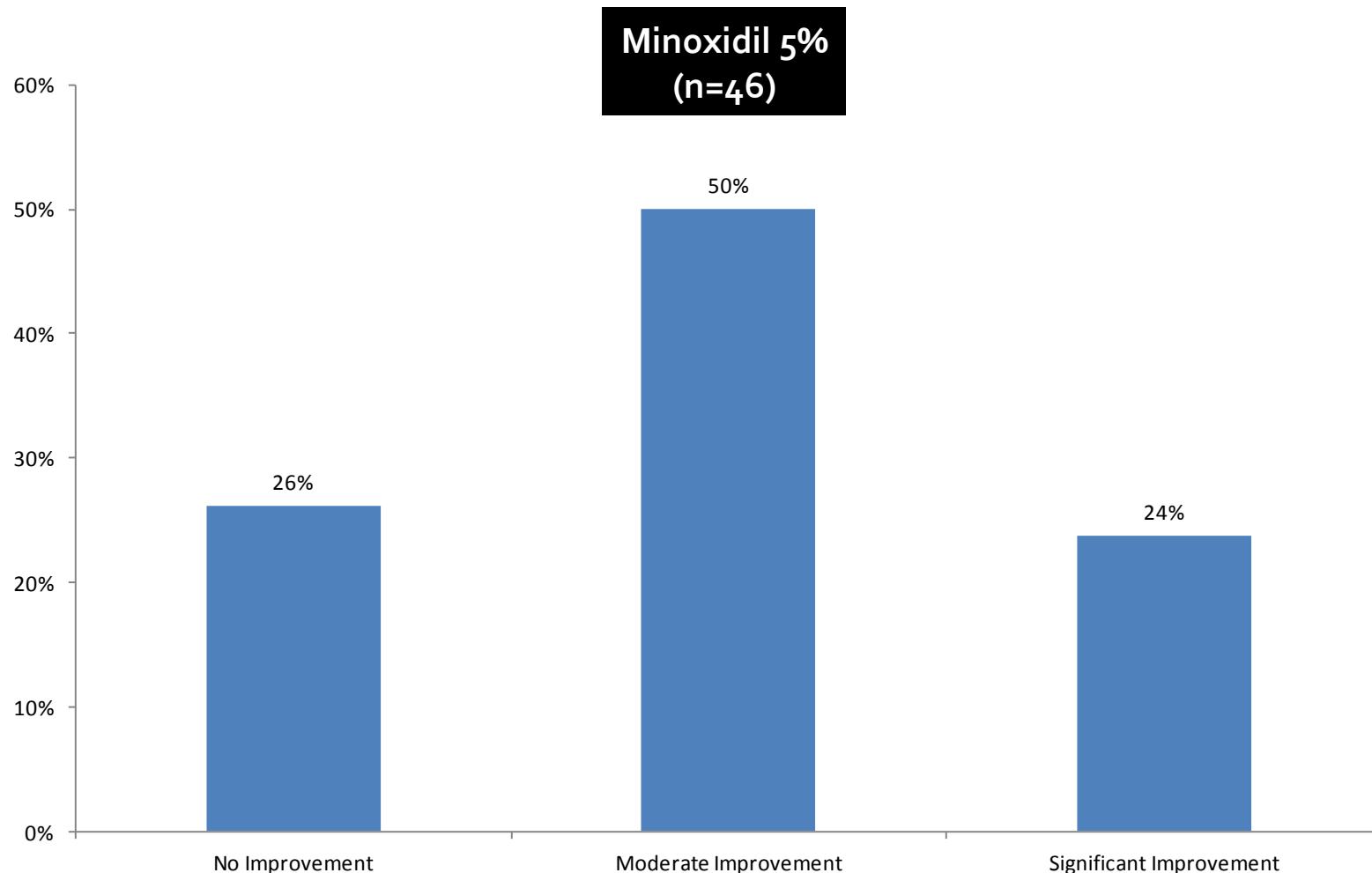
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Endocrine Therapy-Induced Alopecia in Patients With Breast Cancer

Anastrozole, 72 y/o



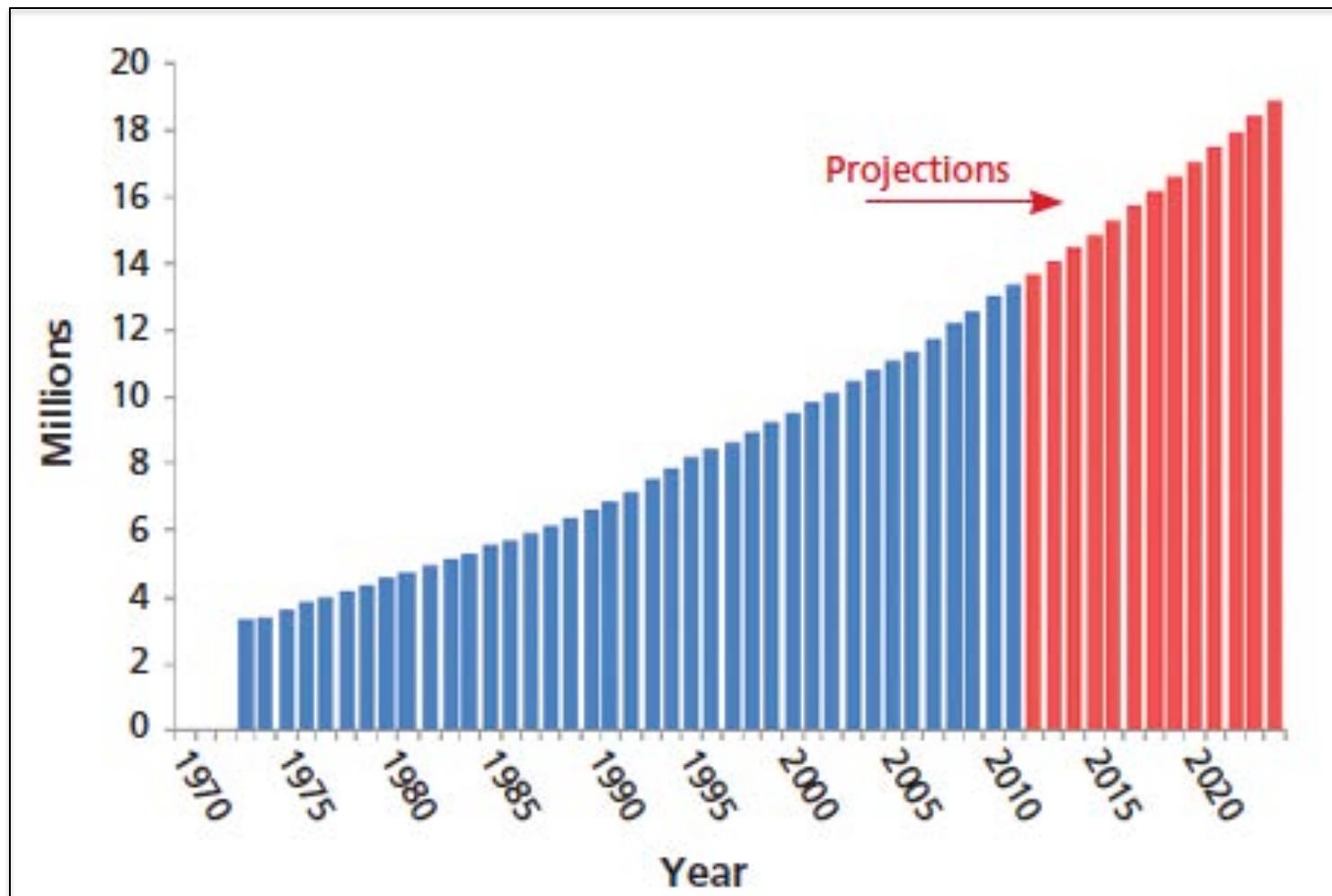
Endocrine Therapy-Induced Alopecia in Patients With Breast Cancer



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Increasing Therapies → Increased Survival

14.7 million in US; 32 million worldwide

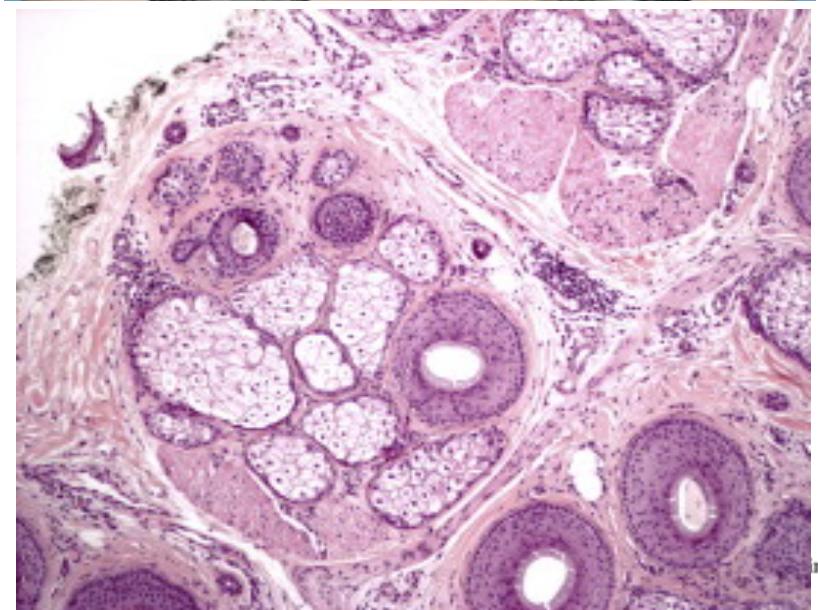


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Alopecia to BRAF/MEK inhibition

Vemurafenib

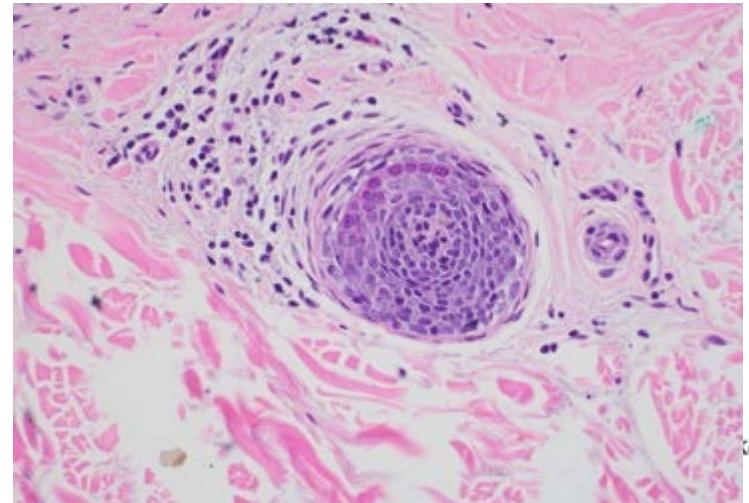
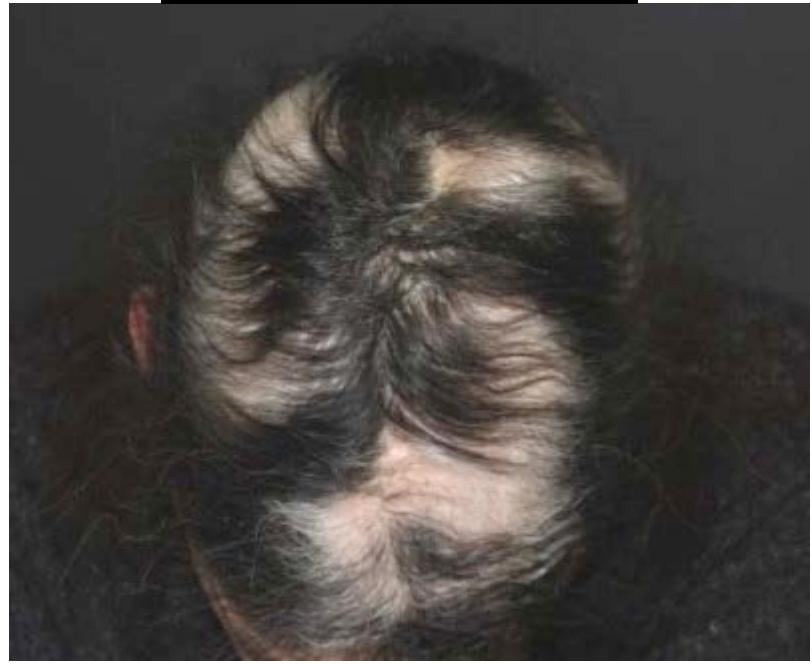
Target	Agent	Incidence %
BRAF Inhibitor(s)	Vemurafenib	23.7%
	Dabrafenib	18.9%
MEK Inhibitor	Trametinib	13.3%
BRAF/MEK Inhibitors	Vemurafenib/ Cobimetinib*	13%
	Dabrafenib/ Trametinib	6%



Alopecia Areata to Immune Checkpoint Inhibitors

Ipilimumab+Nivolumab

- Alopecia reported in 1-1.6%
(n=855)
 - Biopsy: CD4+ T cells, scant
CD8+ T cells
- Areata (totalis, universalis)
- PD-L1 is expressed on the hair
follicle dermal sheath cup cell
- Melanocyte-specific cytotoxic T
cells in melanoma patients
treated with ICI



Late Event: Radiation Induced Alopecia

- Childhood survivors (n=14,358)
 - Incidence: 14%
 - Anxiety: RR 1.38 (95% CI 1.12-1.70)
 - Depression: RR 1.42 (95% CI 1.18-1.71)



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Therapy-Induced Alopecia: Conclusions

- Therapies frequently result in alopecia
- Impact on QoL significant
- Severity usually is grade 1 (mild) and responds to minoxidil and spironolactone
- Alopecia will increase in importance
 - Longer adjuvant therapy and increased survival
 - Decreased incidence of CIA with novel therapies
 - Clinical trials



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Thank you

lacoutum@mskcc.org



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