Applied Metabolic Therapy for Optimizing Cancer Treatment Outcomes

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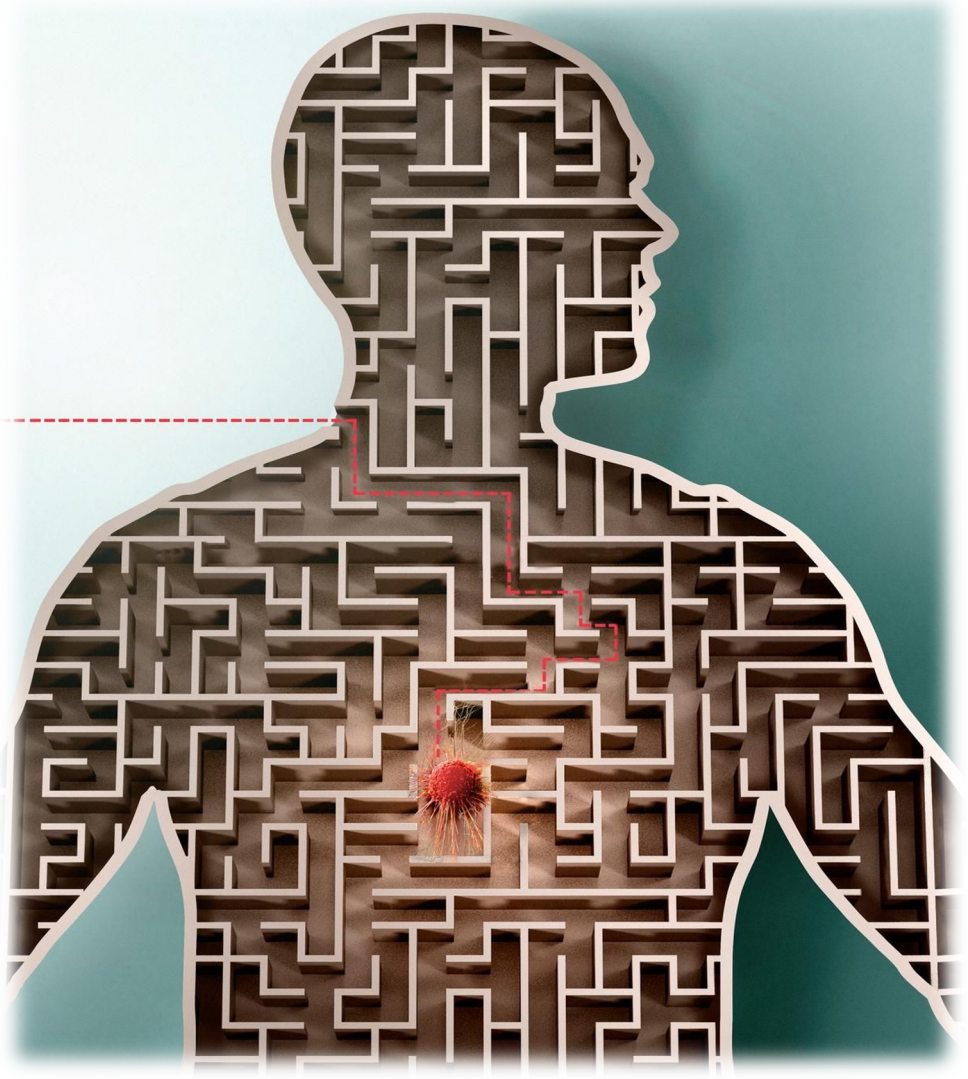
Functional Medicine Consultant, IFM, USA
Association for Ketogenic Metabolic Therapies



Courtesy of Wall street Journal

Disclaimer:

KASR ALAINY
CAIRO UNIVERSITY - FACULTY OF MEDICINE

AWARE CLINIC

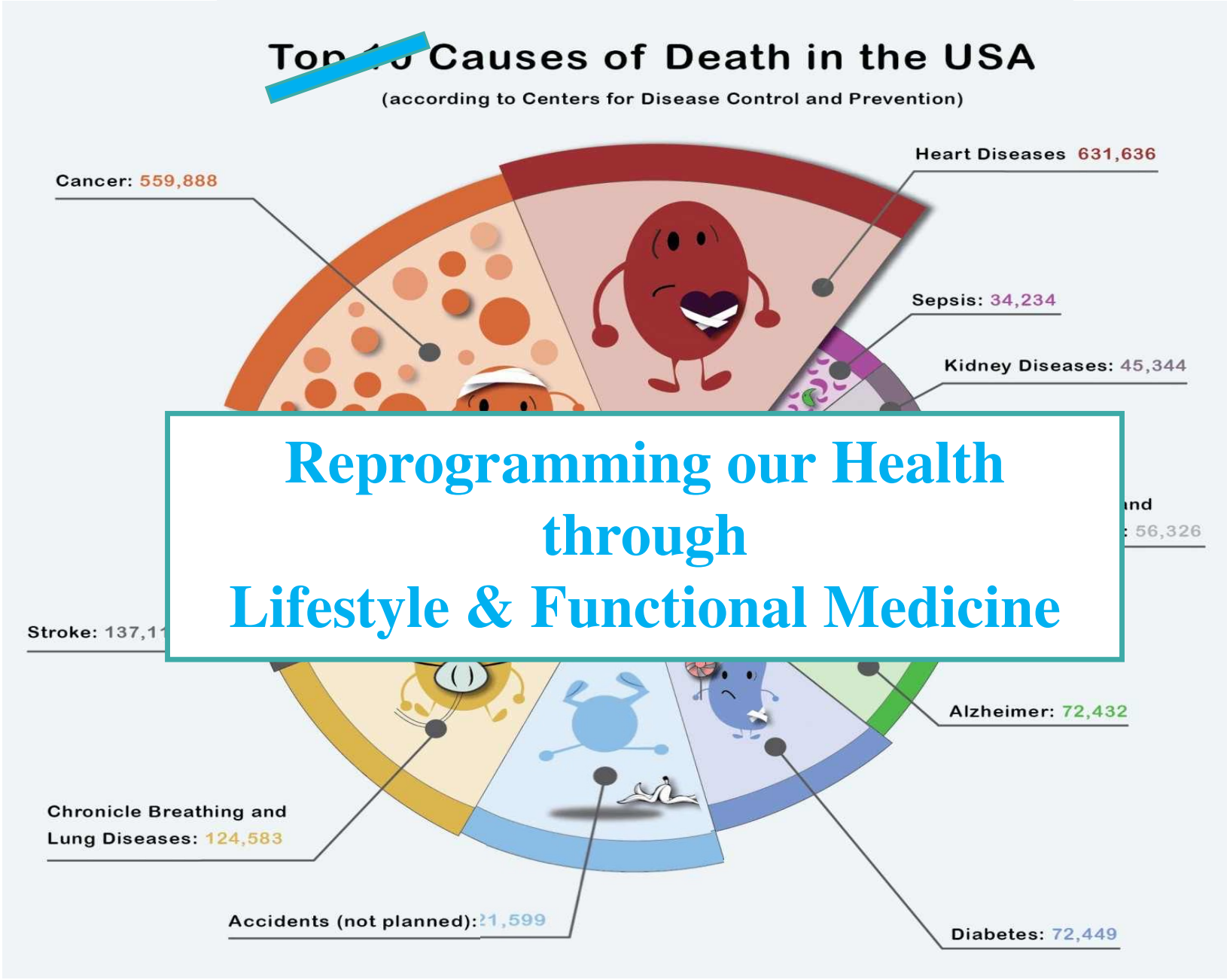
THE INSTITUTE FOR FUNCTIONAL MEDICINE®
CERTIFIED PRACTITIONER

- **Clinical Oncologist, Kasr Alainy Cairo University, Egypt**
- **Certified Functional Medicine Doctor, IFM, USA**
- **Chairperson & co-Founder of AWARE clinic**
- **Advisory Board & Faculty Member of the European Keto-Live Centre for Treatment & Reversing Non-Communicable Diseases.**
- **Member of The Integrative Oncology Working Group, Curriculum Committee, Texas, USA**

IOWG
INTEGRATIVE ONCOLOGY WORKING GROUP

Points of Discussion:

- What did we learn so far?
- Inflammation & Cancer
- The Hallmarks of Cancer
- Tumor Microenvironment
- Which cells are we killing?
- Nature is here to help…



Reprogramming our Health through Lifestyle & Functional Medicine

Inflammatory/Metabolic Diseases:

- Heart Diseases & Stroke
- Cancer
- Chronic Lung Diseases
- Diabetes
- Alzehimer's – NeuroDegenerative.
- Kidney Diseases
- Sepsis

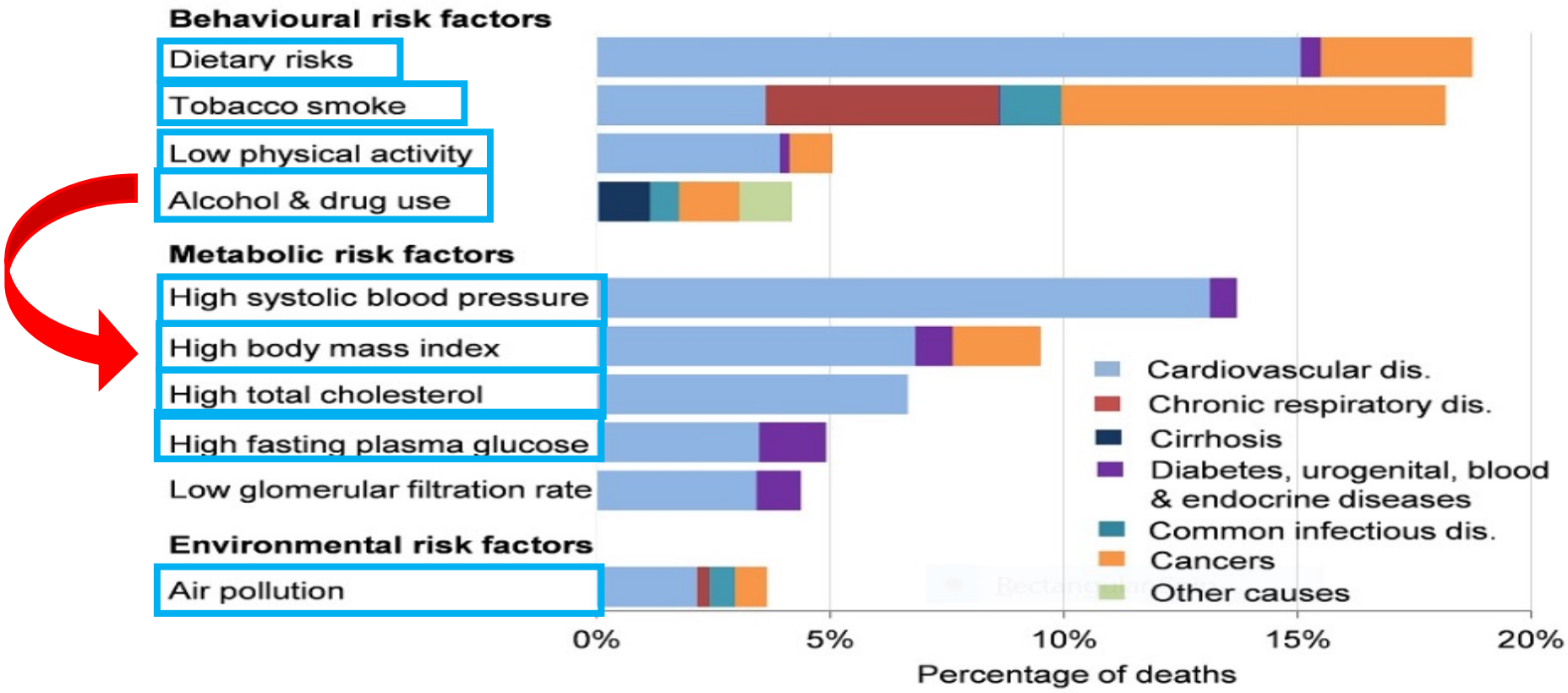
Genetic Predispositions:

- Heart Diseases & Stroke
- Cancer
- Chronic Lung Diseases
- Diabetes
- Alzehimer's – Brain Neurodeg.
- Kidney Diseases
- Sepsis

Factors Contributing to the Global Burden of Disease:

4.1 Figure 3: attribution of deaths to risk factors and broken down by broad causes of death in England, 2013

Among those risk factors included in the GBD analysis, dietary risk factors and tobacco smoke accounted for the most deaths



Source: GBD 2013

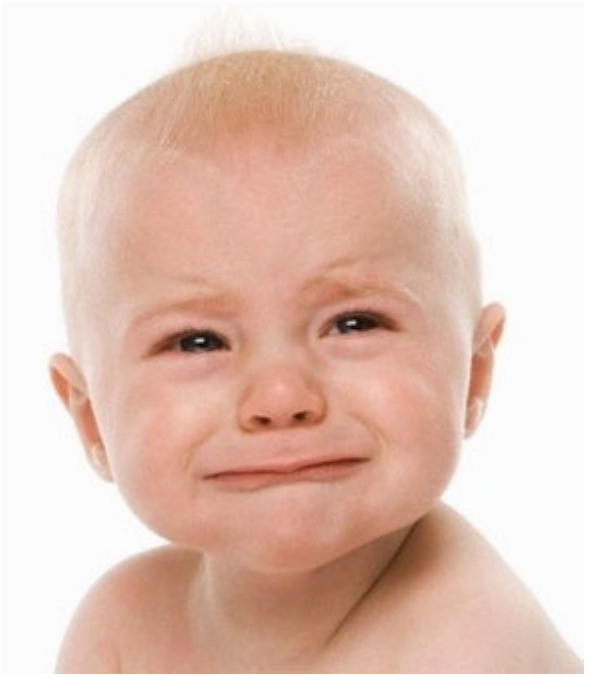
Modifiable Factors!

Lifestyle & Functional Medicine

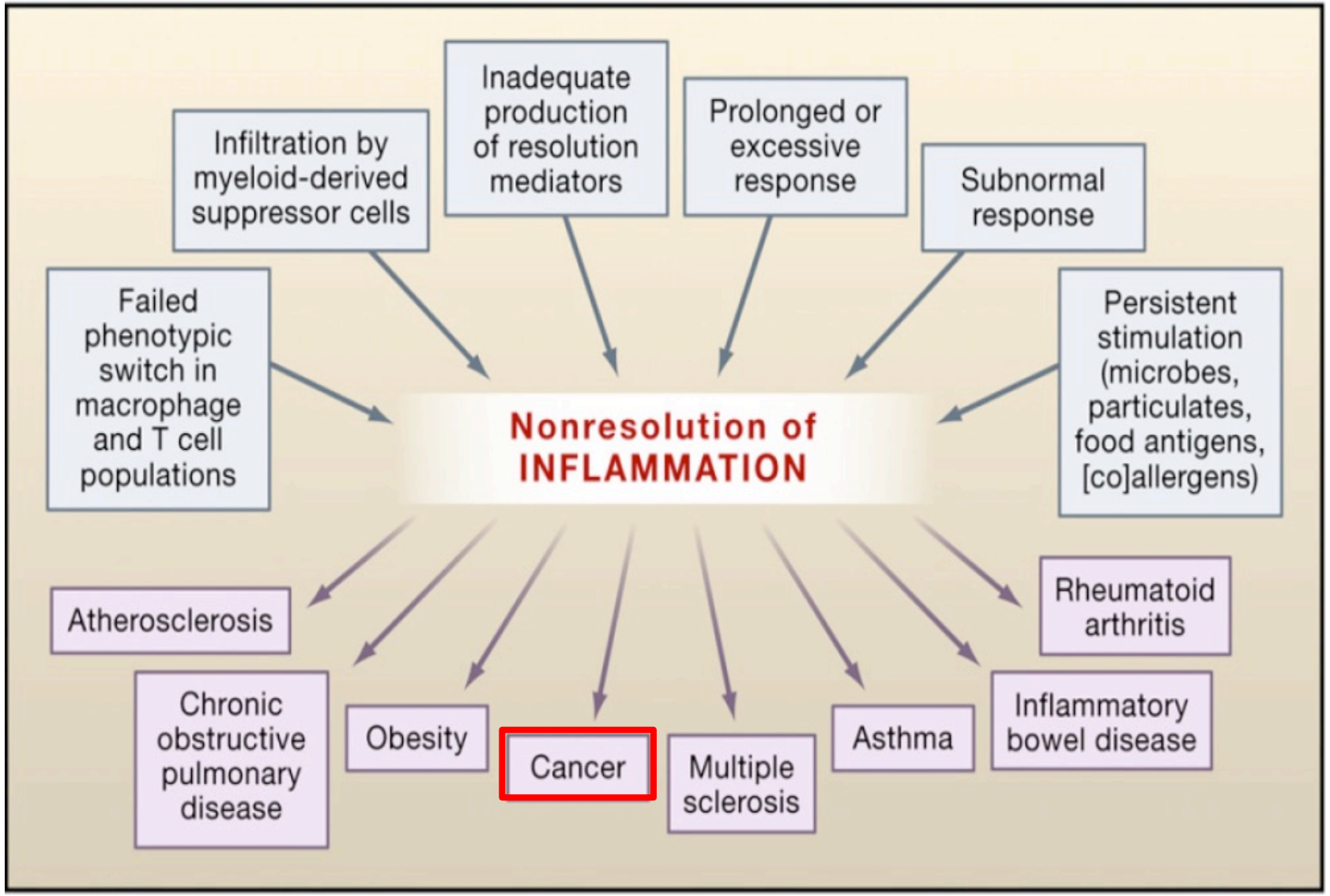
Consequences of Increasing GBD:

- ++ Levels of toxins in our bodies
- ++ Levels attacks of Inflammation
- Non- Resolution of Inflammation
- Chronic Inflammation
- Cells die and cannot regenerate
- Immune Disturbances
- Diseases start & EVOLVE!!

Total Toxic Burden

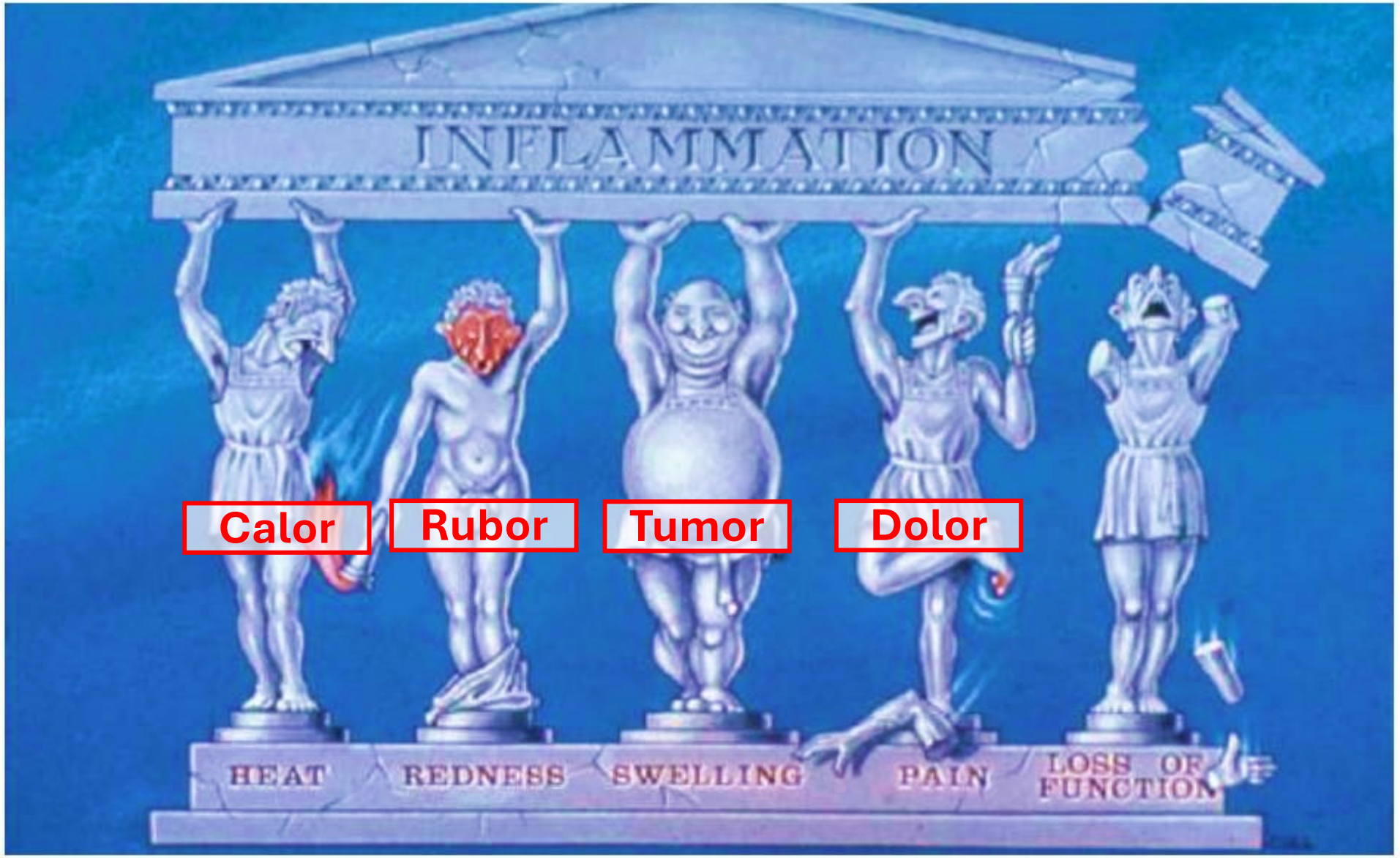


Non-Resolution of Inflammation



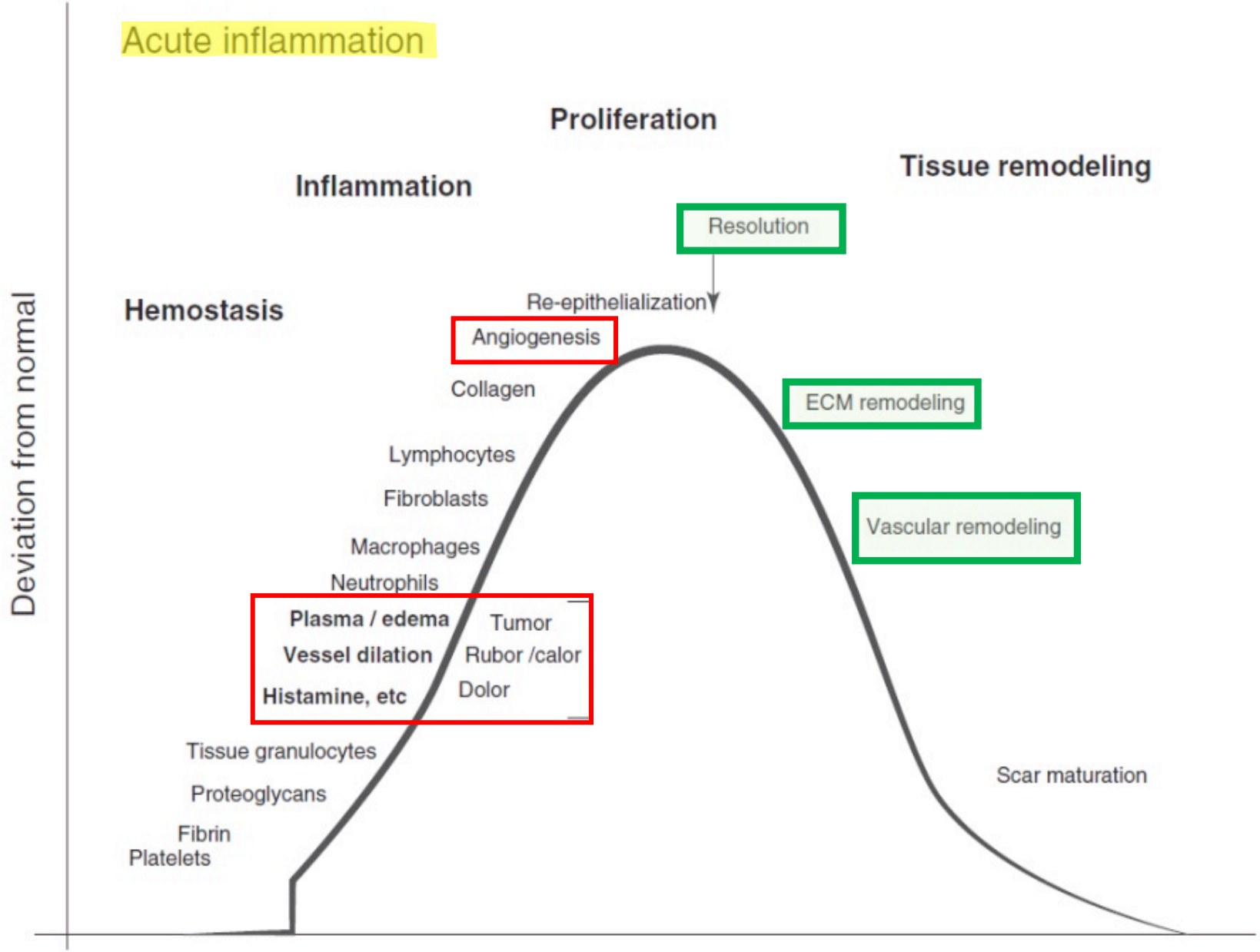
Non Resolving Inflammation. Nathan C. et al.Cell 140, 871–882, March 19, 2010

The five cardinal signs of Acute Inflammation



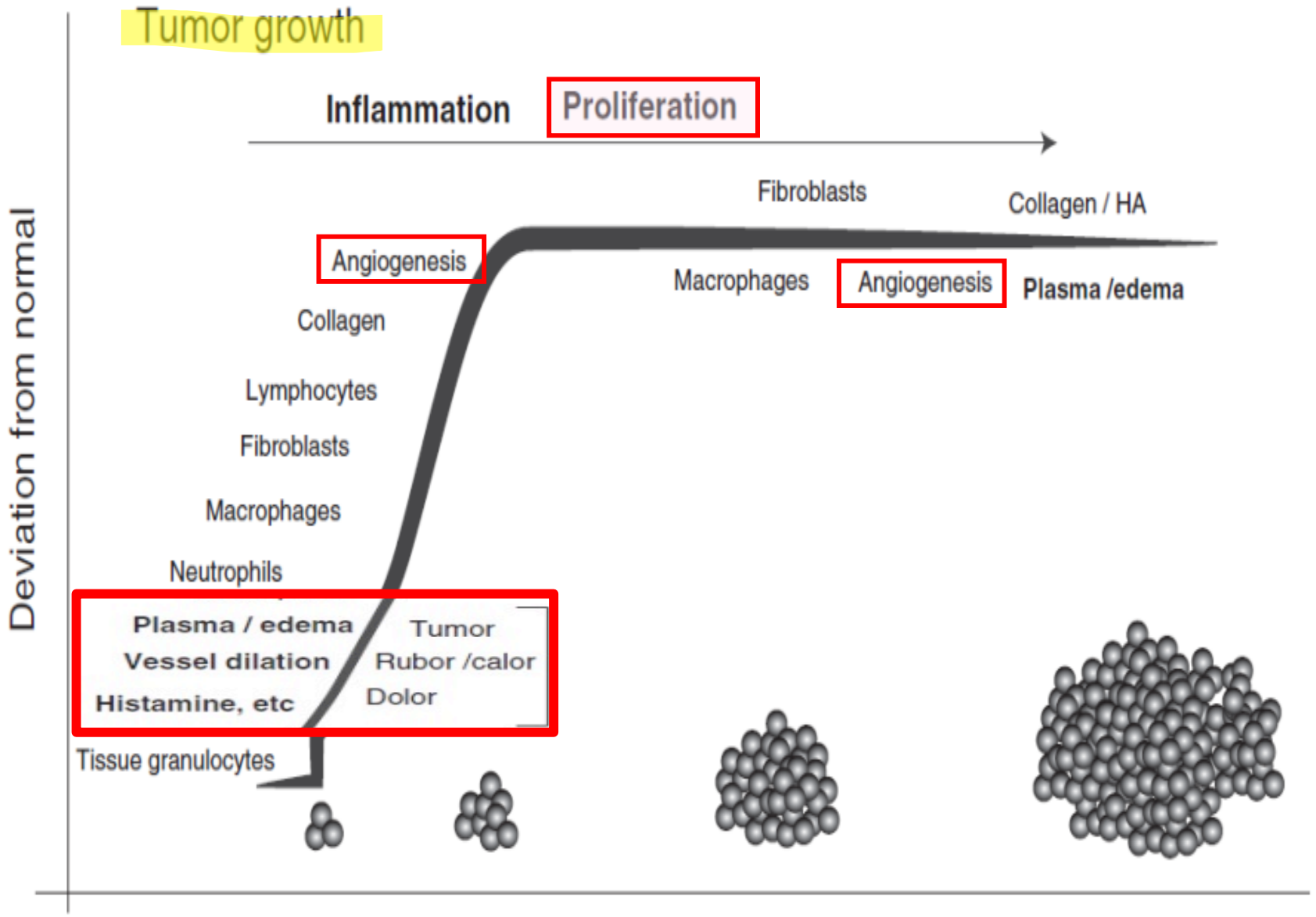
Tumor
Rubor
Calor
Dolor

Inflammation & Cancer



Cancer and inflammation. Wiley Interdiscip Rev Syst Biol Med. 2017 Mar;9(2):10.1002/wsbm.1370

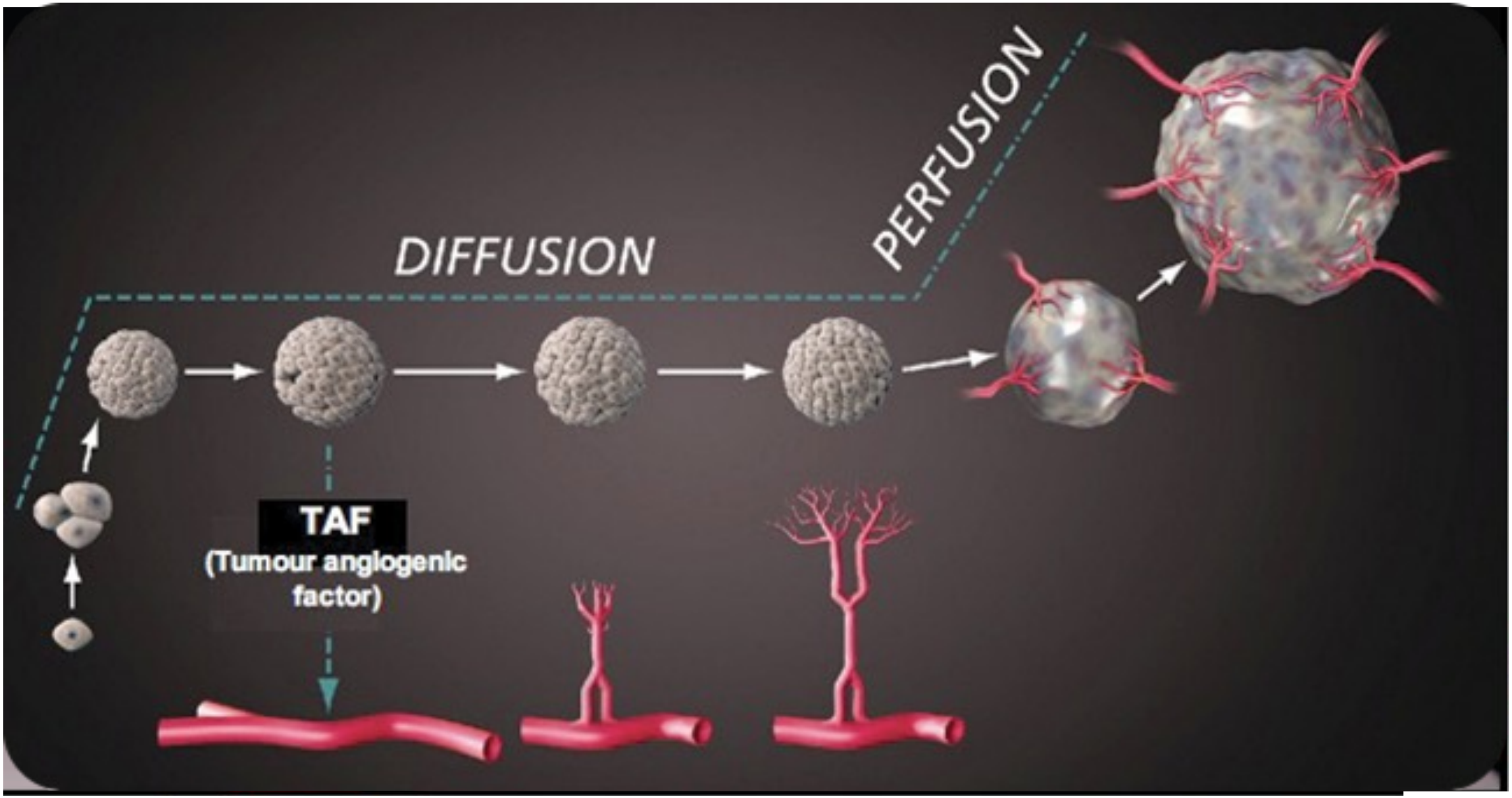
Inflammation & Cancer



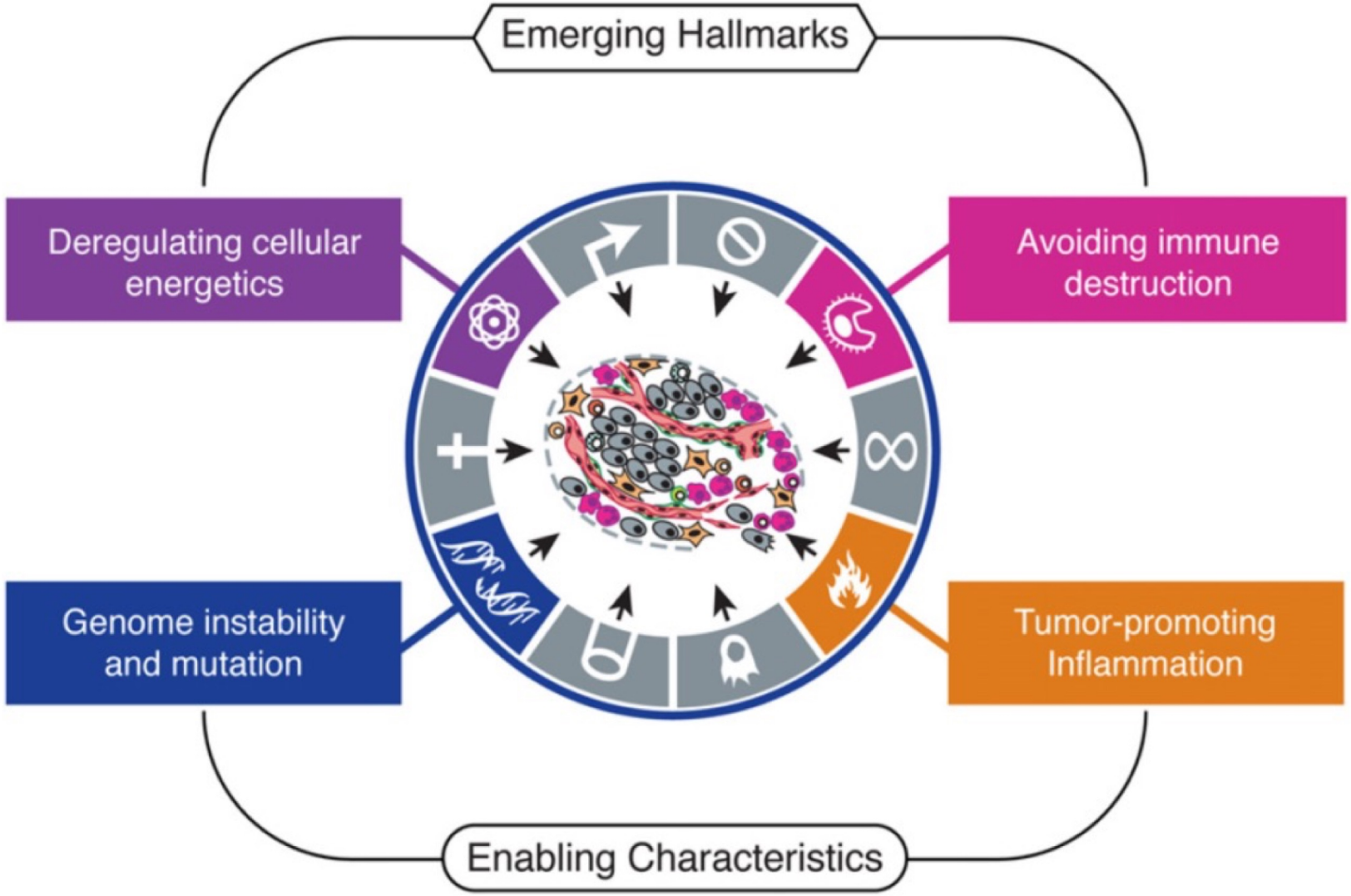
Recruitment of growth factors & starting the hallmarks of cancer

Cancer and inflammation. Wiley Interdiscip Rev Syst Biol Med. 2017 Mar;9(2):10.1002/wsbm.1370

Angiogenesis

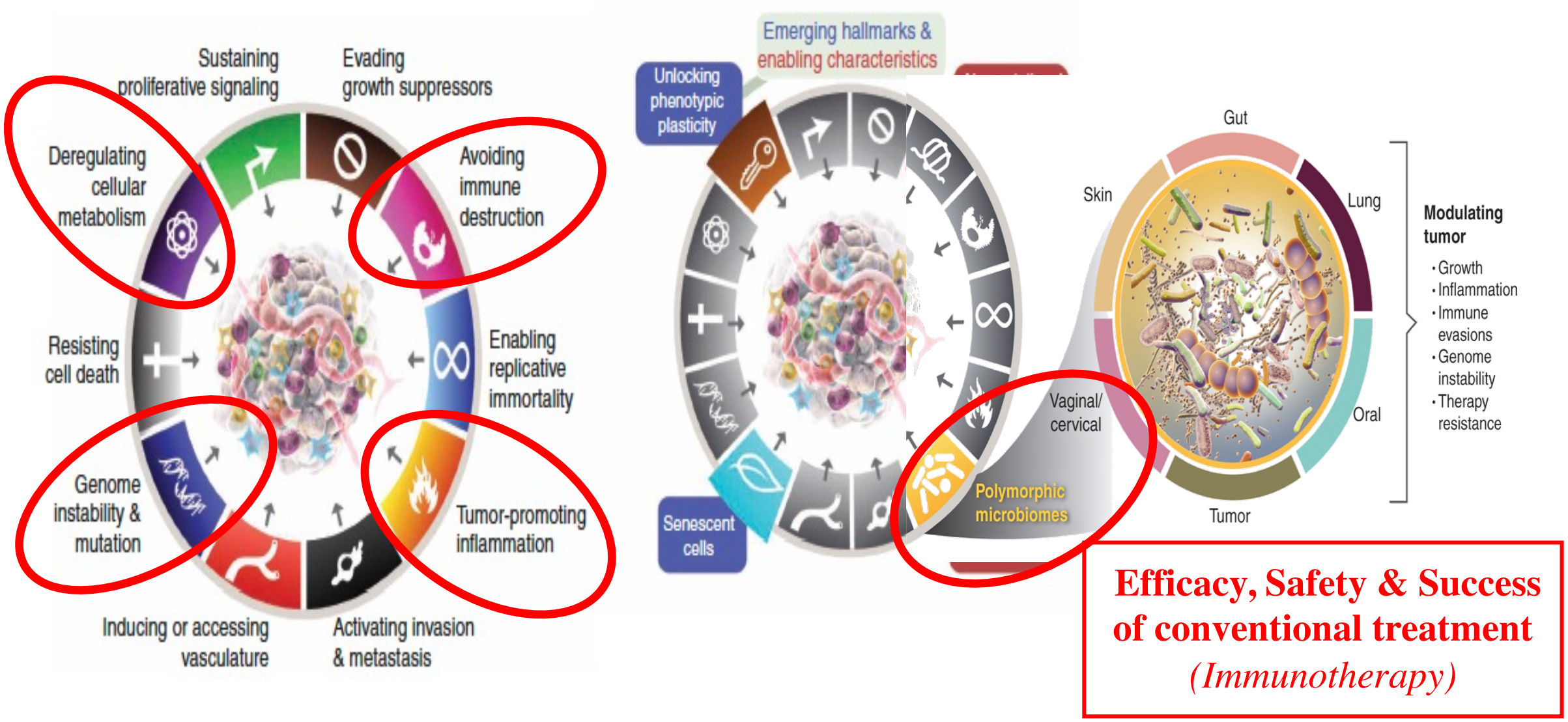


The Development of Hallmarks of Cancer



Hanahan et Weinberg; *CELL. 2011 Mar 4;144(5):646-74.*

The Emerging Hallmarks of Cancer



Efficacy, Safety & Success of conventional treatment
(Immunotherapy)

Douglas Hanahan. Hallmarks of Cancer:New Dimensions. Cancer Discov. 2022;12(1):31-46.

Cancer: Inflammation & Cellular energetics

Journal of Inflammation Research

Dovepress
open access to scientific and medical research

Open Access Full Text Article

REVIEW

Mitochondrial Dynamic Dysfunction as a Main Triggering Factor for Inflammation Associated Chronic Non-Communicable Diseases

This article was published in the following Dove Press journal:
Journal of Inflammation Research

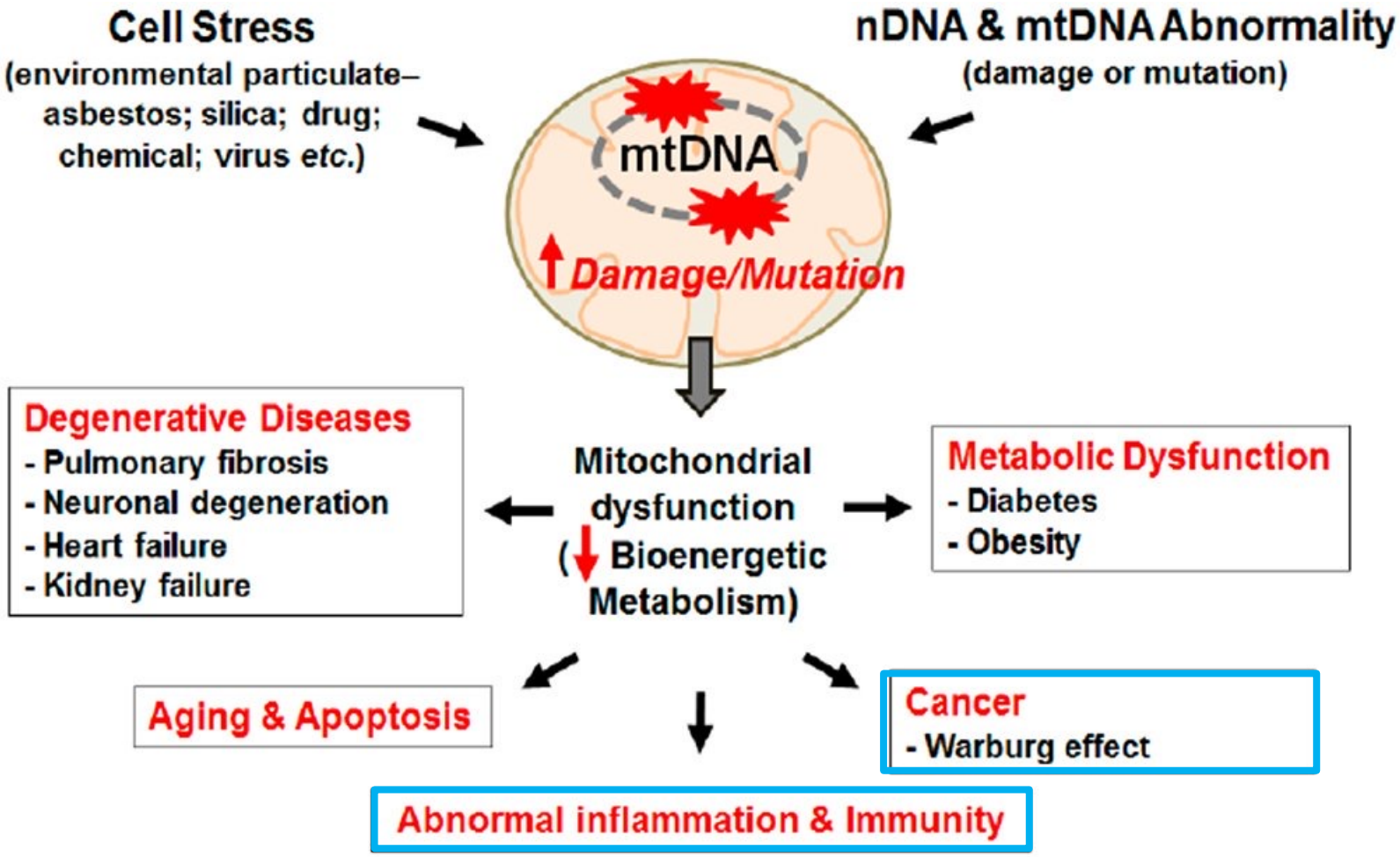
Zeleke Geto[1]
Meseret Derbew Molla[2]
Feyissa Challa[1]
Yohannes Belay[3]
Tigist Getahun[1]

[1]National Reference Laboratory for Clinical Chemistry, Ethiopian Public Health Institute, Addis Ababa, Ethiopia; [2]Department of Biochemistry, School of Medicine, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia; [3]National Reference Laboratory for Hematology and Immunology, Ethiopian Public Health Institute, Addis Ababa, Ethiopia

Abstract: Mitochondria are organelles with highly dynamic ultrastructure maintained by flexible fusion and fission rates governed by Guanosine Triphosphatases (GTPases) dependent proteins. Balanced control of mitochondrial quality control is crucial for maintaining cellular energy and metabolic homeostasis; however, dysfunction of the dynamics of fusion and fission causes loss of integrity and functions with the accumulation of damaged mitochondria and mitochondrial deoxyribose nucleic acid (mtDNA) that can halt energy production and induce oxidative stress. Mitochondrial derived reactive oxygen species (ROS) can mediate redox signaling or, in excess, causing activation of inflammatory proteins and further exacerbate mitochondrial deterioration and oxidative stress. ROS have a deleterious effect on many cellular components, including lipids, proteins, both nuclear and mtDNA and cell membrane lipids producing the net result of the accumulation of damage associated molecular pattern (DAMPs) capable of activating pathogen recognition receptors (PRRs) on the surface and in the cytoplasm of immune

Geto Z et al. Mitochondrial Dynamic Dysfunction as a Main Triggering Factor for Inflammation Associated Chronic Non-Communicable Diseases, J Inflamm Res. 2020;13:97-107

Cancer, Inflammation & Cellular energetics



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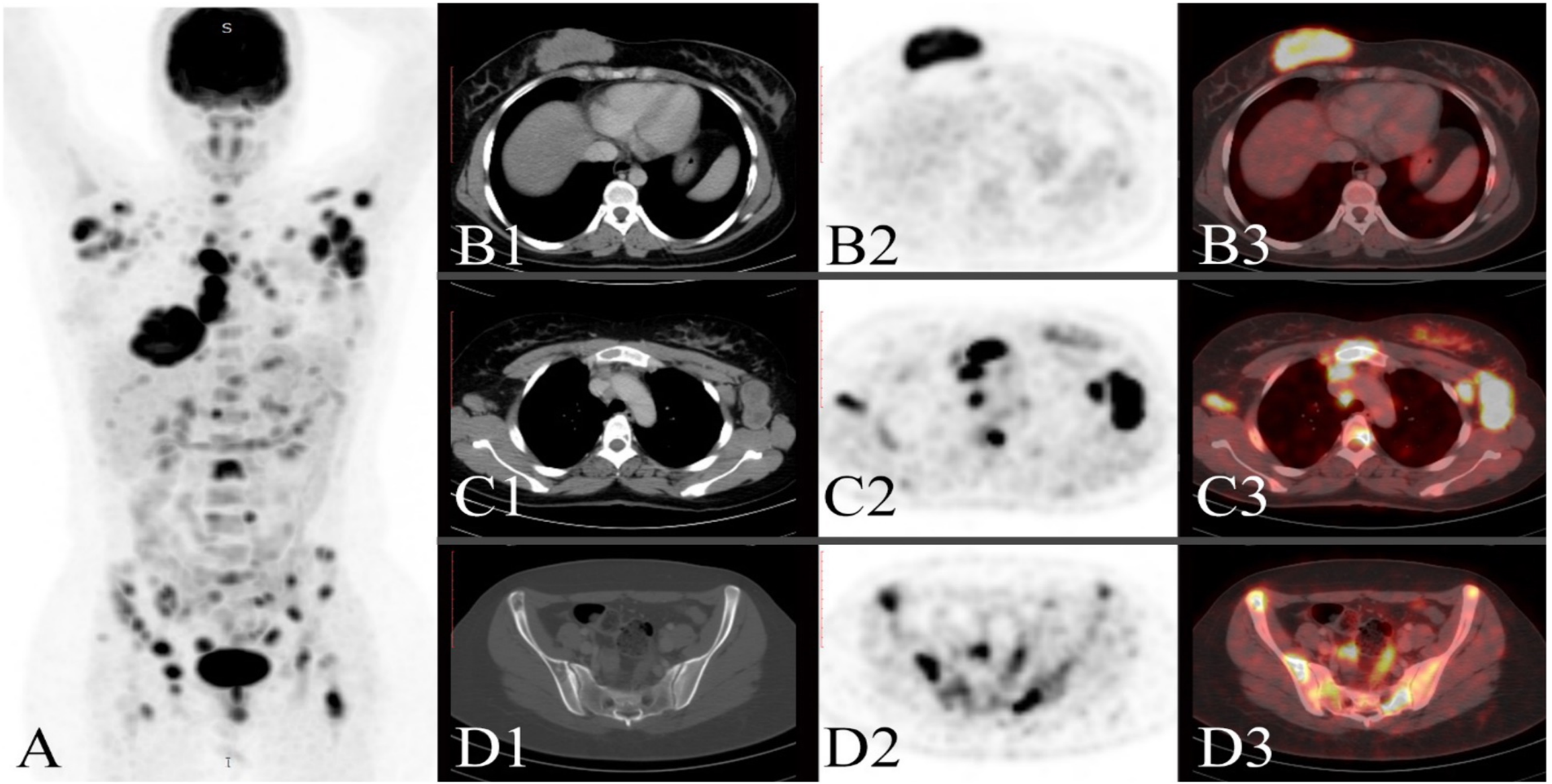
Cancer, Inflammation & Cellular energetics



Cancer: Inflammation, Autoimmunity, Genetic Instability, ..

we still agree that

Sugar is bad!

Li *et al. Journal of Experimental & Clinical Cancer Research* (2019) 38:327
https://doi.org/10.1186/s13046-019-1309-6

Journal of Experimental & Clinical Cancer Research

REVIEW Open Access

Effects of hyperglycemia on the progression of tumor diseases

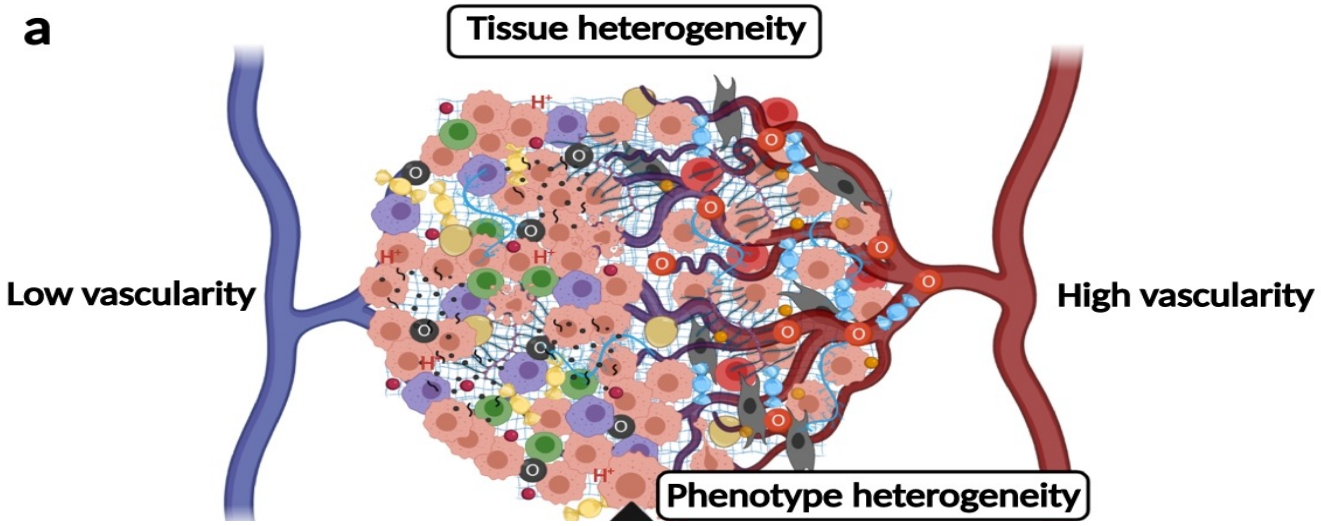
Wenjie Li[1†], Xuehui Zhang[2†], Hui Sang[1], Ying Zhou[1], Chunyu Shang[1], Yongqing Wang[2,3*] and Hong Zhu[1*]

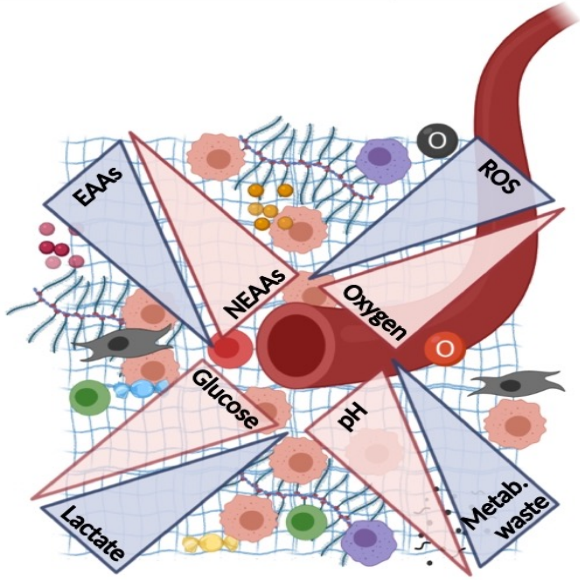
Abstract

Malignant tumors are often multifactorial. Epidemiological studies have shown that hyperglycemia raises the prevalence and mortality of certain malignancies, like breast, liver, bladder, pancreatic, colorectal, endometrial cancers. Hyperglycemia can promote the proliferation, invasion and migration, induce the apoptotic resistance and enhance the chemoresistance of tumor cells. This review focuses on the new findings in the relationship between hyperglycemia and tumor development.

Keywords: Hyperglycemia, Tumor cells, Correlation, Mechanism, Progress

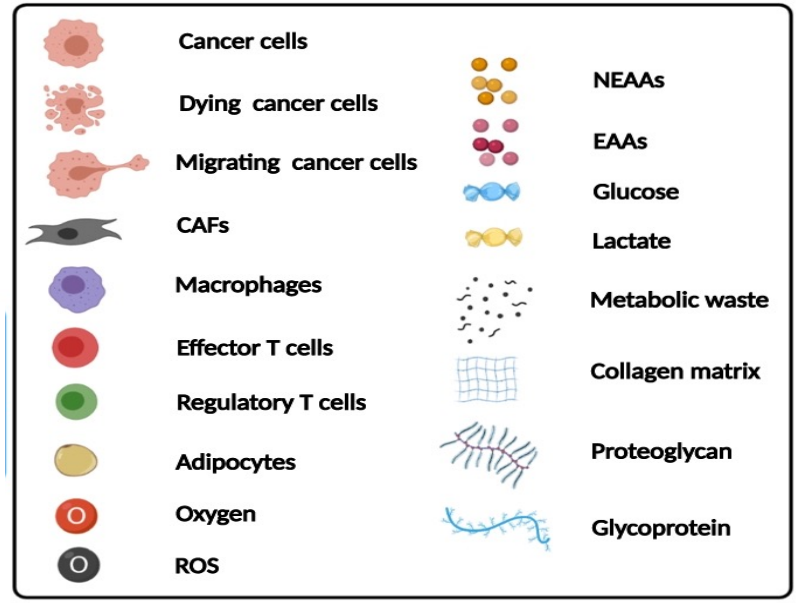
Tumor Microenvironment





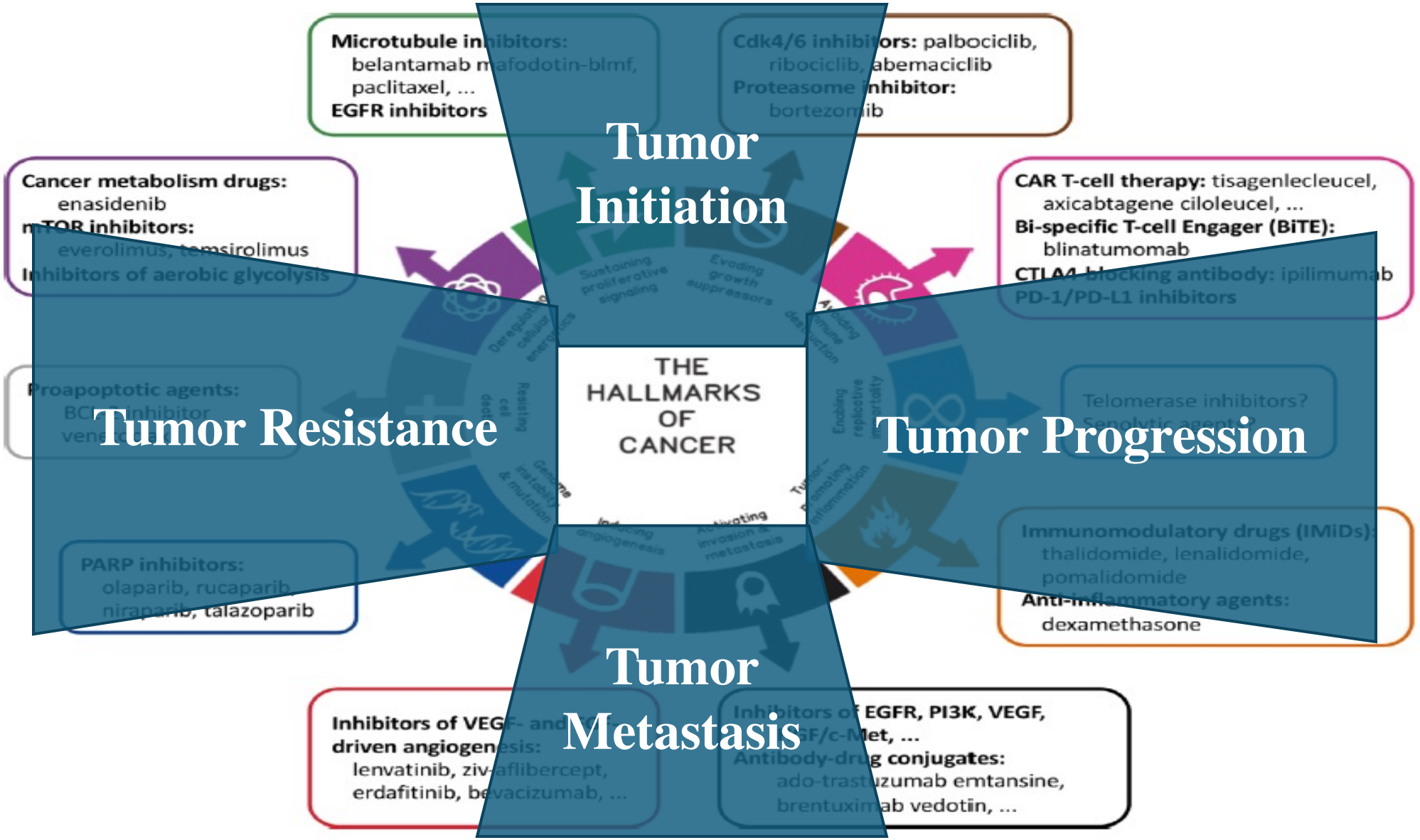
- <u>Cancer Stem Cells Characteristics</u>

- The ability to self-renew
- Self-sufficient
- Promote inflammation
- Resistant to chemotherapeutic drugs
- Not influenced by anti-growth signals
- Not regulated by normal cell functions including apoptosis
- Sustained by angiogenesis and flawed cellular **energy**



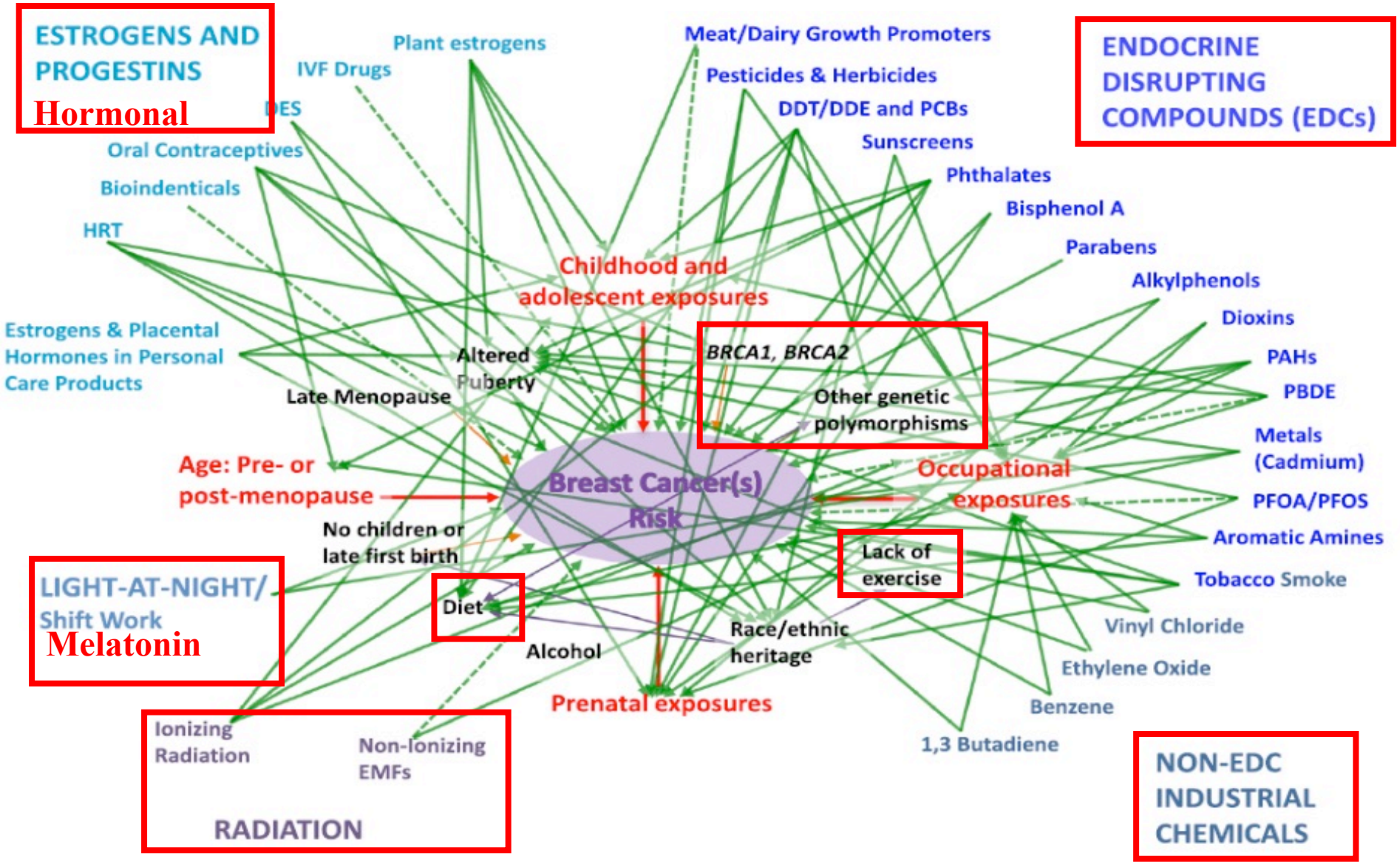
Cancer Metastasis Rev 40, 989–1033 (2021)

Tumor Microenvironment ….Which cells are we killing?



Druggable genome and precision medicine in cancer: current challenges. FEBS J. 2021 Nov;288(21):6142-6158

Tumor Microenvironment ….Which cells are we killing?



State of the evidence 2017: an update on the connection between breast cancer and the environment. Environ Health. 2017 Sep 2;16(1):94.

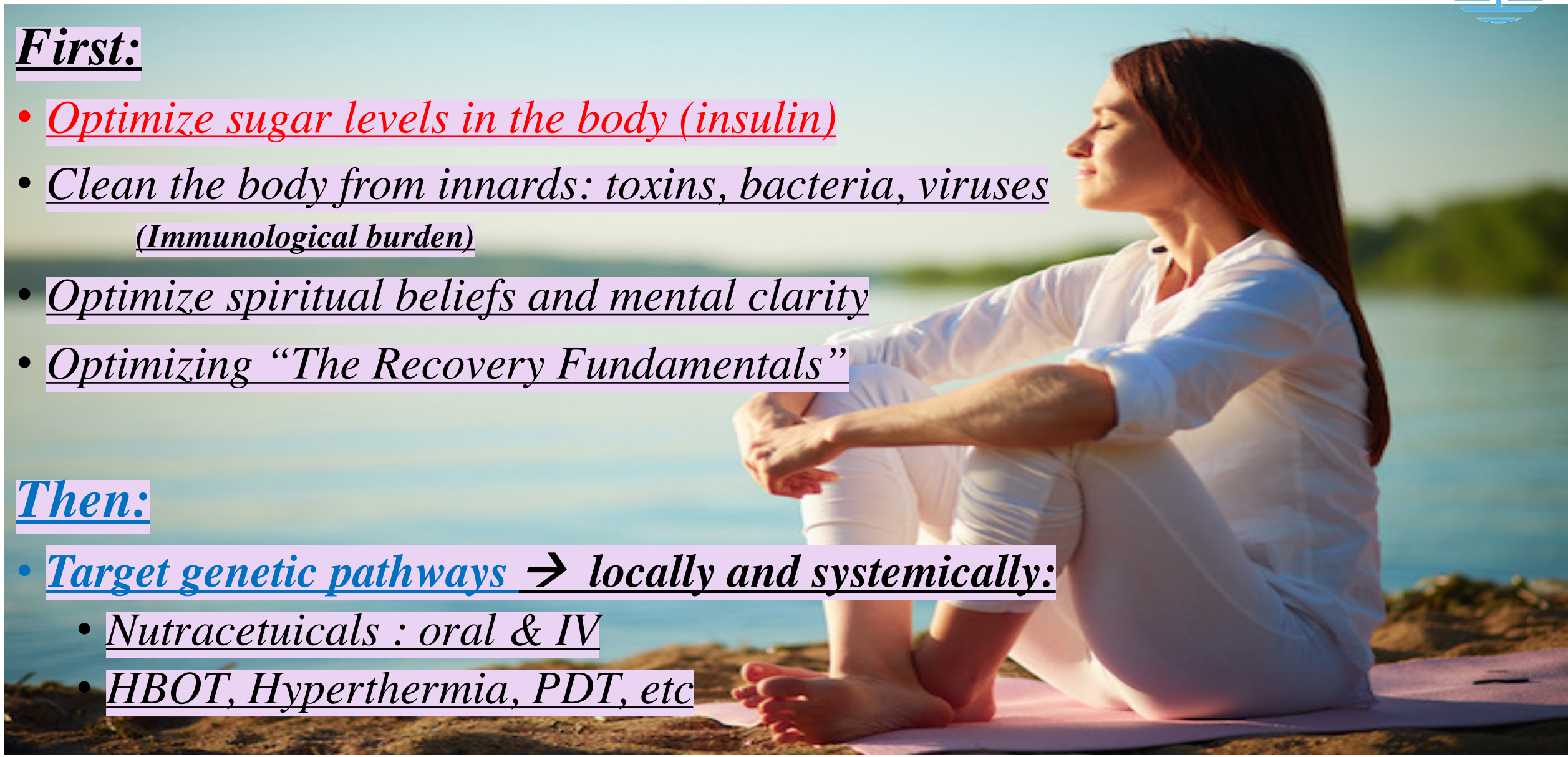
FDA approved Treatments for Breast cancer according to Pathology & Stage

- Abraxane (Paclitaxel Albumin-stabilized Nanoparticle)
- Afinitor (Everolimus) mTOR -I
- Arimidex (Anastrozole) AI
- Aromasin (Exemestane) AI
- Cyclophosphamide CTH
- Doxorubicin Hydrochloride CTH
- Epirubicin Hydrochloride CTH
- 5-FU (Fluorouracil Injection) CTH
- Faslodex (Fulvestrant) HR
- Femara (Letrozole) AI
- Gemcitabine Hydrochlorid
- Herceptin (Trastuzu
- Ibrance (Palbociclib)
- Ixempra (Ixabepilone)
- Kadcyla (Ado-Trastuzumab Emtansine) MAB + CTH
- Keytruda (Pembrolizumab) MAB
- Kisqali (Ribociclib) CDK4/6 -I
- Lapatinib Ditosylate TKI
- Lynparza (Olaparib) PARP-I (BRCA mut)
- Methotrexate Sodium CTH
- Nerlynx (Neratinib Maleate) TKI
- Perjeta (Per ab) MAB
- Pigra PIK3-I
- oparib Tosylate) PARP-I (BRCA mut)
- en Citrate HR
- axotere (Docetaxel) CTH
- Tecentriq (Atezolizumab) MAB
- Tepadina (Thiotepa) CTH
- Trodelvy (Sacituzumab Govitecan-hziy) Topo2I-I
- Tucatinib TKI
- Verzenio (Abemaciclib) CDK4/6-I
- Vinblastine Sulfate CTH
- Xeloda (Capecitabine) CTH
- Zoladex (Goserelin Acetate) HR

Who takes What, Why & When?

https://www.cancer.gov/about-cancer/treatment/drugs/breast

Host Microenvironment ….Which cells are we reviving?



First:

- *Optimize sugar levels in the body (insulin)*
- *Clean the body from innards: toxins, bacteria, viruses*

  (Immunological burden)
- *Optimize spiritual beliefs and mental clarity*
- *Optimizing "The Recovery Fundamentals"*

Then:

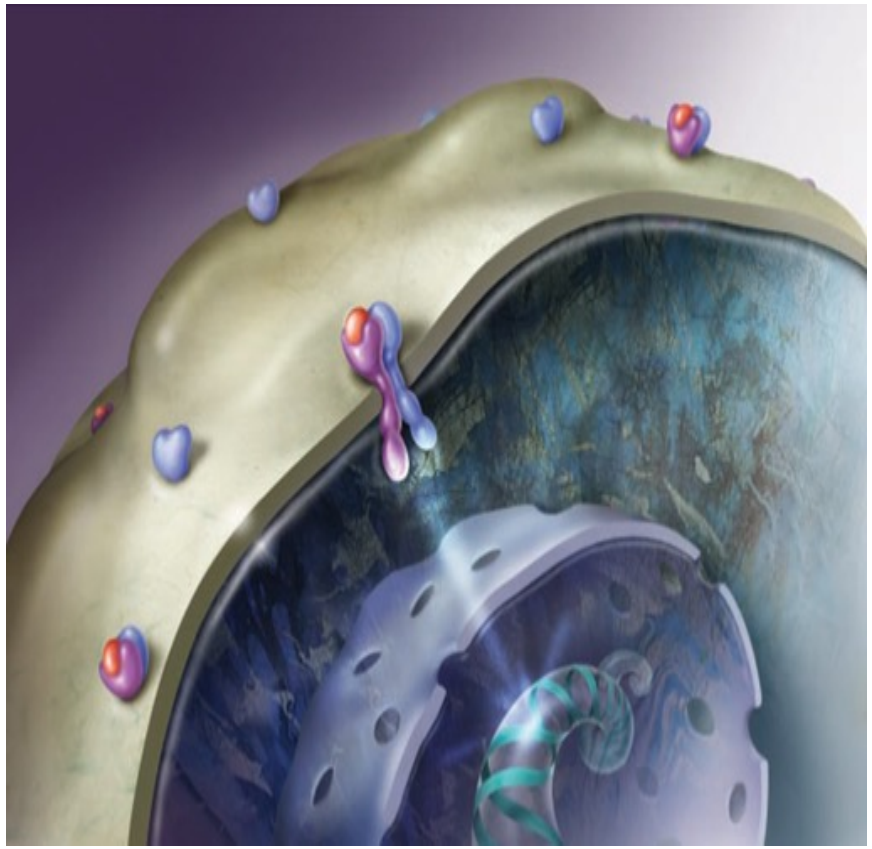
- ***Target genetic pathways → locally and systemically:***
  - *Nutracetuicals : oral & IV*
  - *HBOT, Hyperthermia, PDT, etc*

Do you want to block genes and Target Pathways?

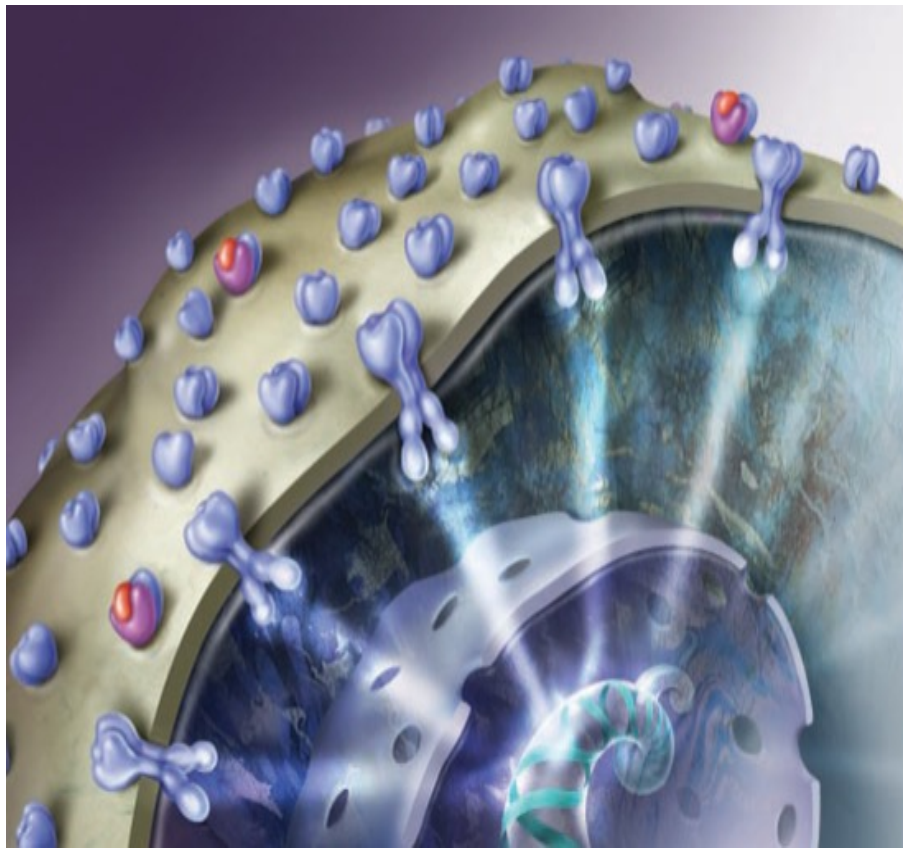
- - ***Cancer Genetics:*** *(analyzed in tissue biopsy)*
- *e.g BRCA, TP53, HER2, ALK, PI3K/AKT, EGFR, PD-1*

Examples of Cancer Genetics HER2-*neu* Gene (ERBB2)

Normal HER2 Expression
20 000 receptors/cell



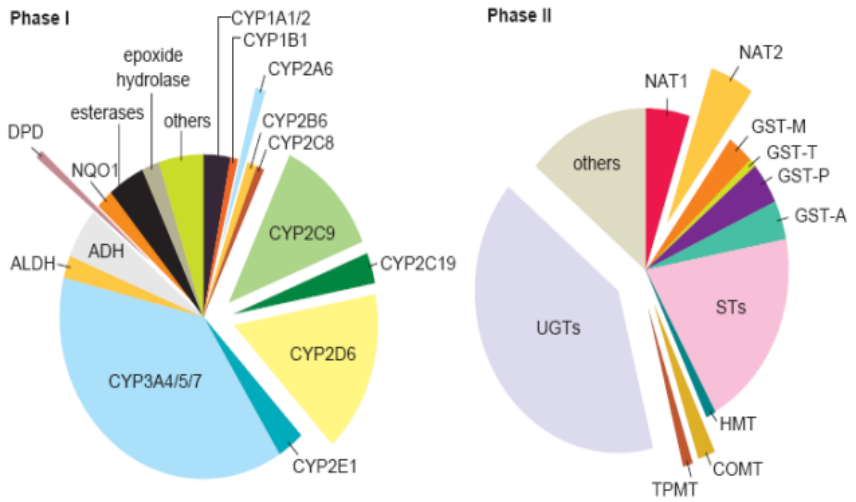
HER2 Over Expression
2 000 000 receptors/cell



HER2 Amplification

Do you want to block genes and Target Pathways?

- ***Cancer – Genetic mutations:*** *(analyzed in tissue biopsy)*
- *e.g BRCA, TP53, HER2, ALK, PI3K/AKT, EGFR, PD-1*



- ***Host- Blueprint/Software Genetics:***
- ***DNA Protection, Damage & Repair.*** *(Vulnerability)*
- ***Inflammation & Anti-oxidant protection*** *(FIRE)*
- ***Methylation & Detoxification genes*** *(Toxic Burden & Drug metabolism)*
- ***Hormone Support & Neurotransmitters*** *(Messengers)*
- ***Macronutrient Metabolism*** *(The Right Diet)*
- ***Cardiovascular Health, Blood health*** *(Blood Viscosity,Oxygen,Stamina)*

Blueprint/software genetics for Prevention

Original Article

J Gynecol Oncol Vol. 22, No. 2:110-119
DOI:10.3802/jgo.2011.22.2.110

pISSN 2005-0380
eISSN 2005-0399

Journal of Gynecologic Oncology
JGO

Combined effect of *CYP1B1*, *COMT*, *GSTP1*, and *MnSOD* genotypes and risk of postmenopausal breast cancer

Conclusion: Individual susceptibility to breast cancer incidence may be increased by combined effects of the high-risk genotypes in CYP1B1, COMT, and MnSOD estrogen metabolic genes.

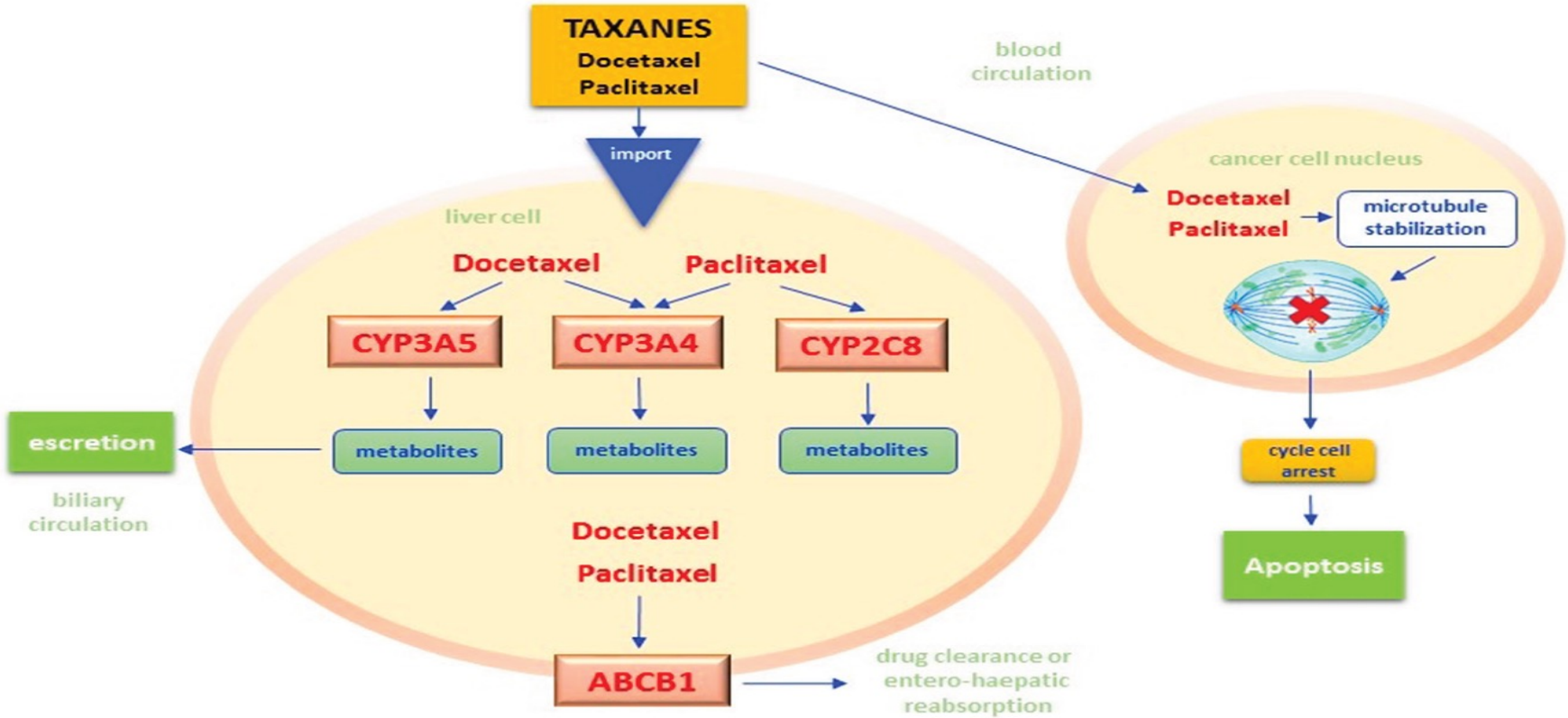
Significant associations were observed among women with two high-risk genotypes in **CYP1B1 and COMT** (OR, 2.0; 95% CI, 1.1 to 3.5) and two high-risk genotypes in **COMT and MnSOD** (OR, 2.0; 95% CI, 1.0 to 3.8), compared to those with low-risk genotypes.

Blueprint/software genetics for Optimizing Treatments

www.oncotarget.com Oncotarget, 2018, Vol. 9, (No. 38), pp: 25355-25382

Review

SNPs in predicting clinical efficacy and toxicity of chemotherapy: walking through the quicksand



Metabolized & Eliminated Properly?

Role of Nutraceuticals / Supplements?

YOU cannot supplement yourself out of a bad diet!

Need a quick good start

Nature is here to Help…

Hindawi
BioMed Research International
Volume 2022, Article ID 5425485, 18 pages
https://doi.org/10.1155/2022/5425485

Review Article

Plants in Anticancer Drug Discovery Mechanism to Chemoprevention

Arif Jamal Siddiqui,[1] **Sadaf Jahan**,[2] **Ritu Sin**
Syed Amir Ashraf,[6] **Andleeb Khan**,[7] **Ranjay**
Santhanaraj Balakrishnan,[8,9] **Riadh Badraoui**

[1]*Department of Biology, College of Science, University of Hail, Hail,*
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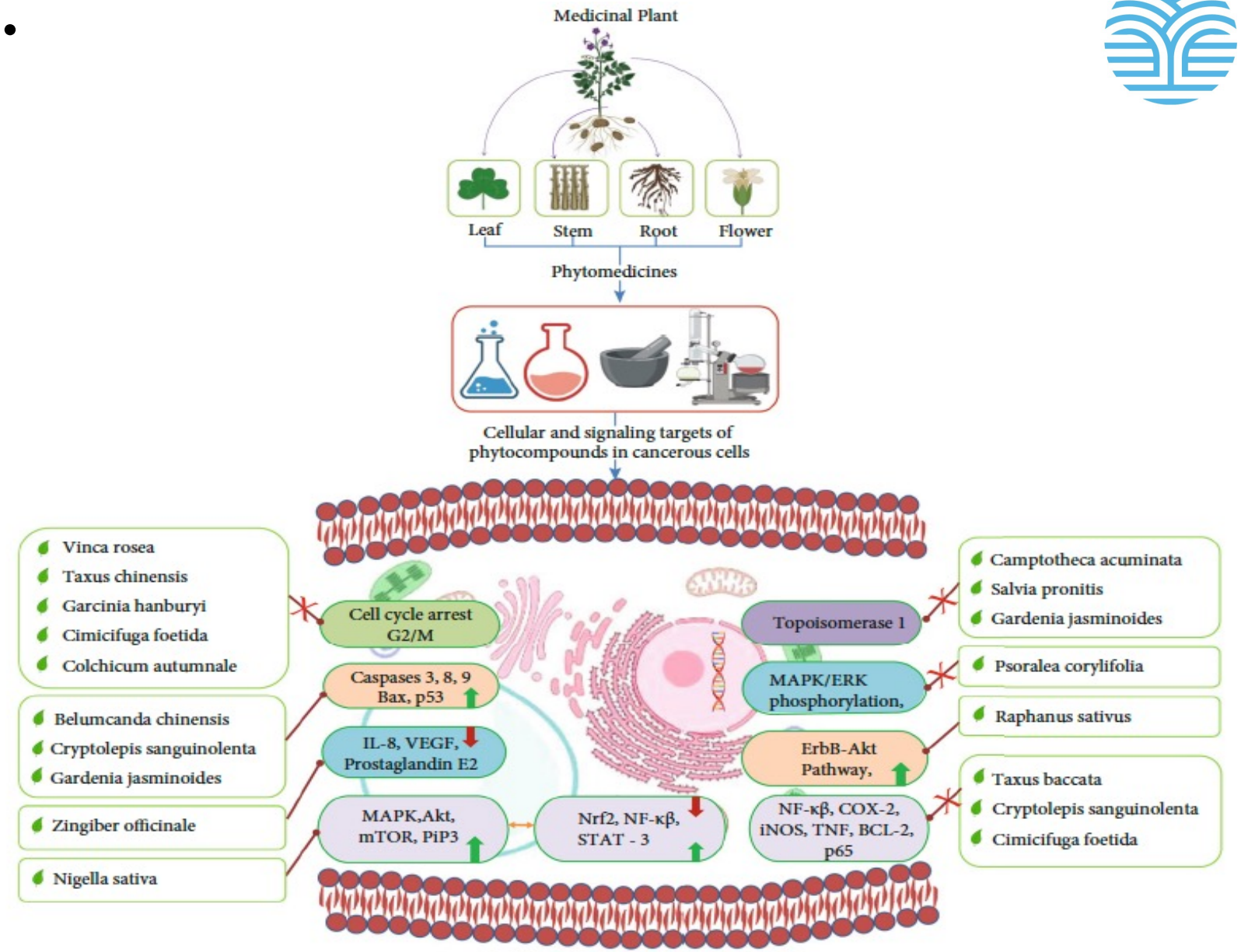
Al-Majmaah 11952, Saudi Arabia
[3]*Department of Environmental Sciences, School of Earth Sciences, Ce*
[4]*Faculty of Applied Sciences and Biotechnology, Shoolini University (*
Himachal Pradesh, India
[5]*Department of Biotechnology, University Institute of Biotechnology,*
Chandigarh State Hwy, Punjab, India



Plants in Anticancer Drug Discovery: From Molecular Mechanism to Chemoprevention. Biomed Res Int. 2022 Mar 2;2022:5425485

Nature is here to Help…

Biomedicine & Pharmacotherapy 150 (2022) 113054

Contents lists available at ScienceDirect

Biomedicine & Pharmacotherapy

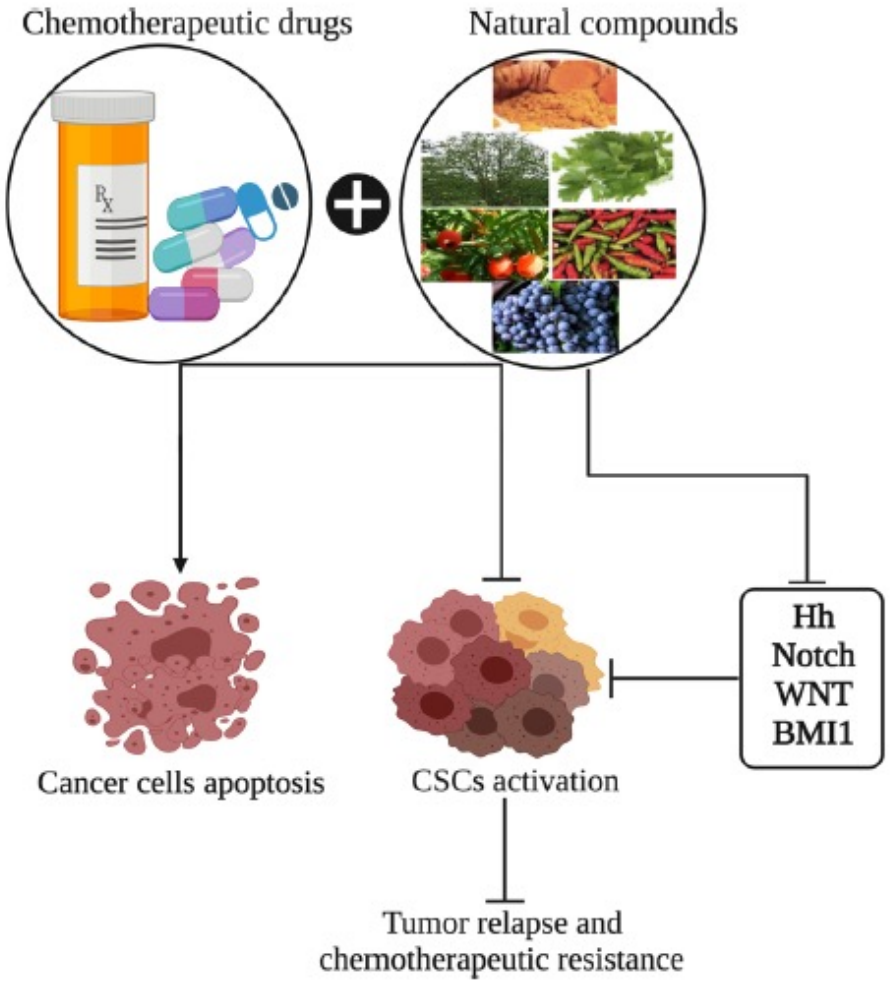
journal homepage: www.elsevier.com/locate/biopha

Review

Targeting cancer signaling pathways by natural products: Exploring promising anti-cancer agents

Sheema Hashem [a,1], Tayyiba Akbar Ali [a,1], Sabah Akhtar [a,1], Sabah Nisar [a], Geetanjali Sageena [b], Shahid Ali [c], Sharefa Al-Mannai [d], Lubna Therachiyil [e,f], Rashid Mir [g], Imadeldin Elfaki [h], Mohammad Muzaffar Mir [i], Farrukh Jamal [j], Tariq Masoodi [a], Shahab Uddin [e], Mayank Singh [k], Mohammad Haris [a,l,m], Muzafar Macha [n,*], Ajaz A. Bhat [a,**]

[a] Laboratory of Molecular and Metabolic Imaging, Sidra Medicine, Doha, Qatar
[b] Keshav Mahavidyalaya, University of Delhi, New Delhi 110034, India
[c] International Potato Center (CIP), Shillong, Meghalaya, India
[d] Division of Translational Medicine, Research Branch, Sidra Medicine, Doha 26999, Qatar



Targeting cancer signaling pathways by natural products: Exploring promising anti-cancer agents. Biomed Pharmacother. 2022 Jun;150:113054.

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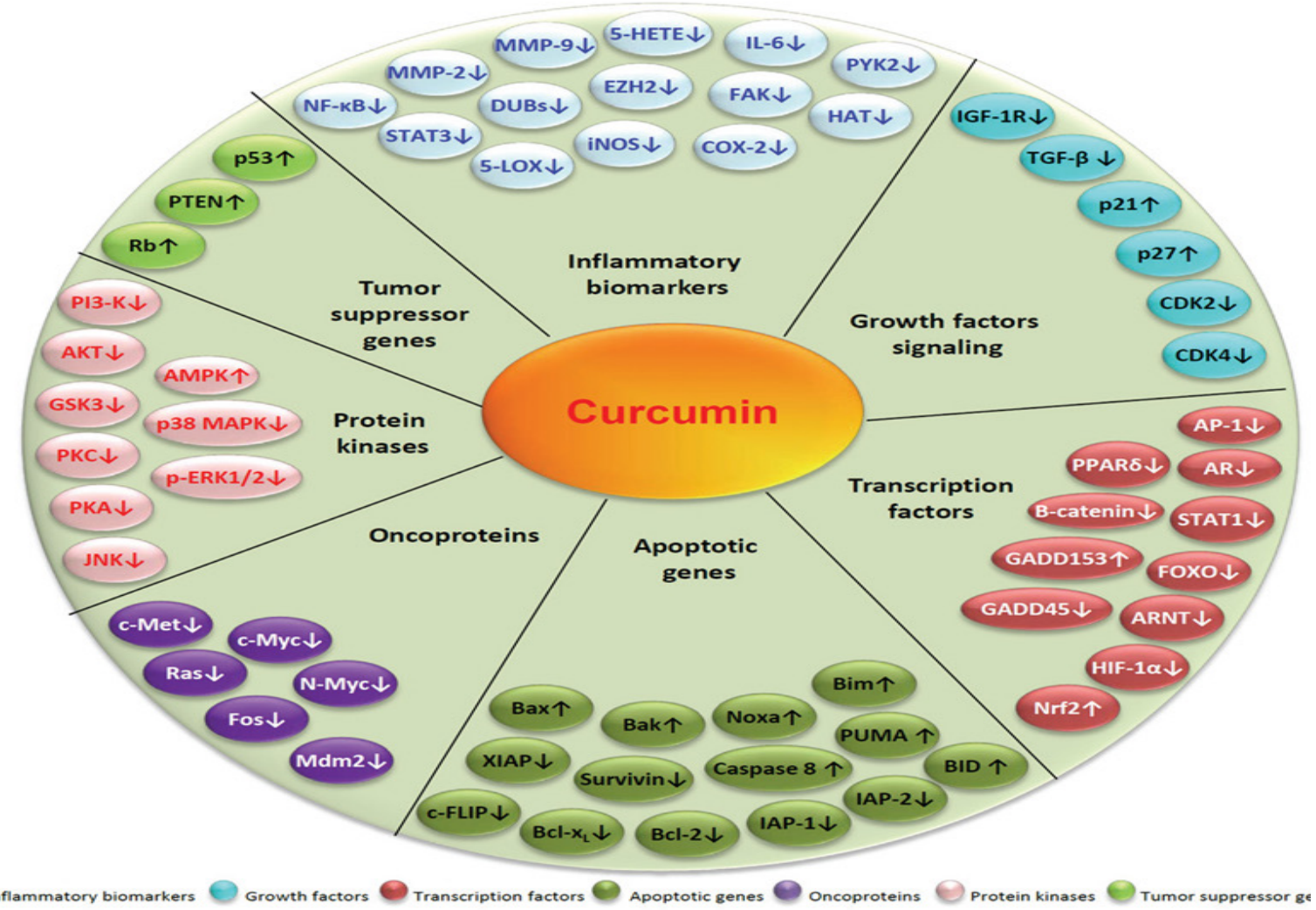
Curcumin



Targets CSC

- **Optimizes Chemotherapy**
- **Targets CSCs**
- **Prevents invasion & metastates**

Ramasamy et al. Cancer Cell Int (2015) 15:96

Combined with 5-FU or FOLFOX proved a superior therapeutic strategy for chemoresistant colon cancer

Curr Colorectal Cancer Rep (2014) 10:62–67

Curcumin & Resveratrol synergistically inhibit the growth of transformed cells & colon carcinogenesis.

Nutr Cancer 2009, 61(4): 544-53

Multitargeting by curcumin as revealed by molecular interaction studies. *Nat Prod Rep. 2011 Nov;28(12):1937-55*

Nature is here to Help…

Sulforaphane:

Targets CSC

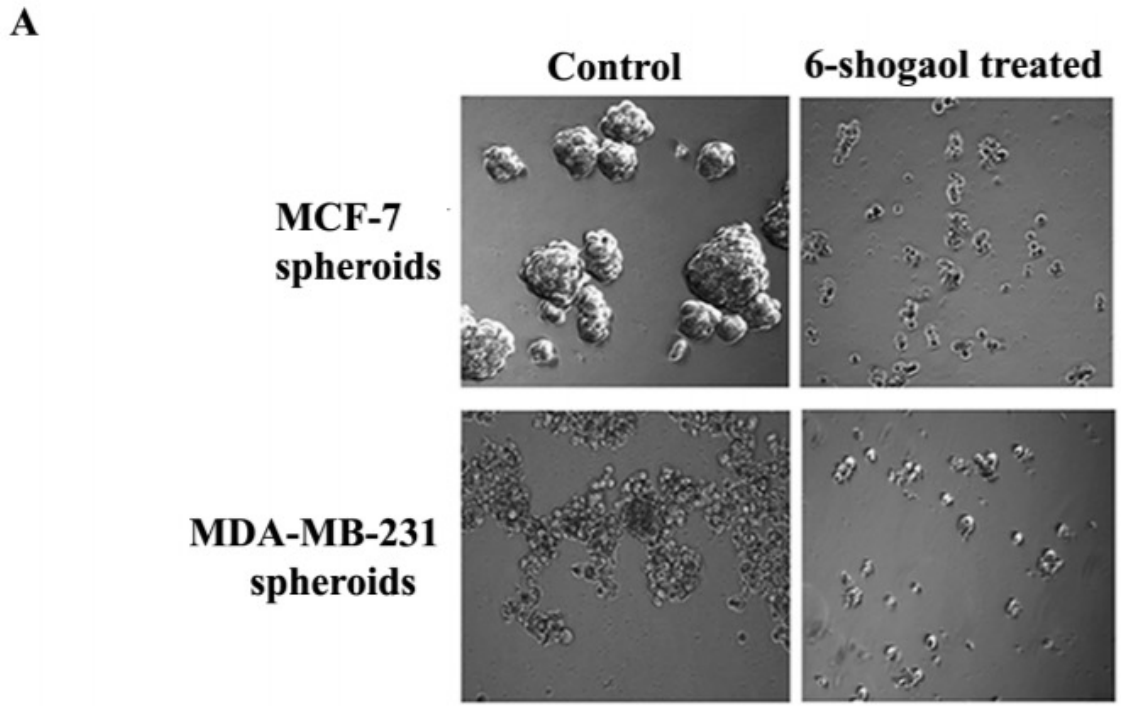
Table 1: The epigenetic regulation of sulforaphane (SFN) in cancer.

Epigenetic mechanisms	Cancer types	Epigenetic functions	Target genes/ proteins	Anticancer effects	References
Histone acetylation	Prostate cancer cells (LnCaP and PC-3) and PC-3 cell xenografts	Inhibition of class I and II HDACs	Reactivation of p21 and Bax	Cell cycle arrest and apoptosis↑	[42, 45, 49]
	Colon cancer cells (HCT116)	Inhibition of HDAC3	CtIP: a critical DNA repair protein Acetylation of CtIP and its degradation	DNA damage and apoptosis↑	[43]
	Lung cancer cells (A549 and H1299) and A549 cell xenografts	Inhibition of HDAC activity	Reactivation of p21 and Bax	Cell growth↓ Apoptosis↑	[44]
Histone phosphorylation	Bladder cancer cells (RT4, J82, and UMUC3) and UMUC3 cell xenografts	Inhibition of histone H1 phosphorylation	Increased PP1β and PP2A phosphatase	Carcinogenesis and progression↓	[55]
DNA methylation	Prostate cancer cells (LNCap)	Decreased expression of DNMT1 and 3b	Restoration of cyclin D2	Cancer cell death↑	[59]
	Human breast cancer cells (MCF-7 and MDA-MB-231)	Inhibition of DNMT1 expression	Restoration of P21, PTEN, and RARbeta2	Cell growth arrest and apoptosis↑	[61]
	Human breast cancer cells (MCF-7 and MDA-MB-231)	Decrease in DNMT1 and 3a expression and activity	Downregulation of hTERT expression	Apoptosis↑	[58]
	Cervical cancer cells (HeLa)	Inhibition of DNMT3b activity	Upregulation of RARβ, CDH1, DAPK1 and Bax	Cell cycle arrest and apoptosis↑	[60]

Anticancer Activity of Sulforaphane: The Epigenetic Mechanisms and the Nrf2 Signaling Pathway. Oxidative Medicine and Cellular Longevity. Volume 2018, Article ID 5438179

Nature is here to Help…

6 Shoagal (GINGER) Targets CSC



6-Shogaol Inhibits Breast Cancer Cells and Stem Cell-Like Spheroids by Modulation of Notch Signaling Pathway and Induction of Autophagic Cell Death. PLoS One. 2015 Sep 10;10(9):e0137614.

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Targets CSC

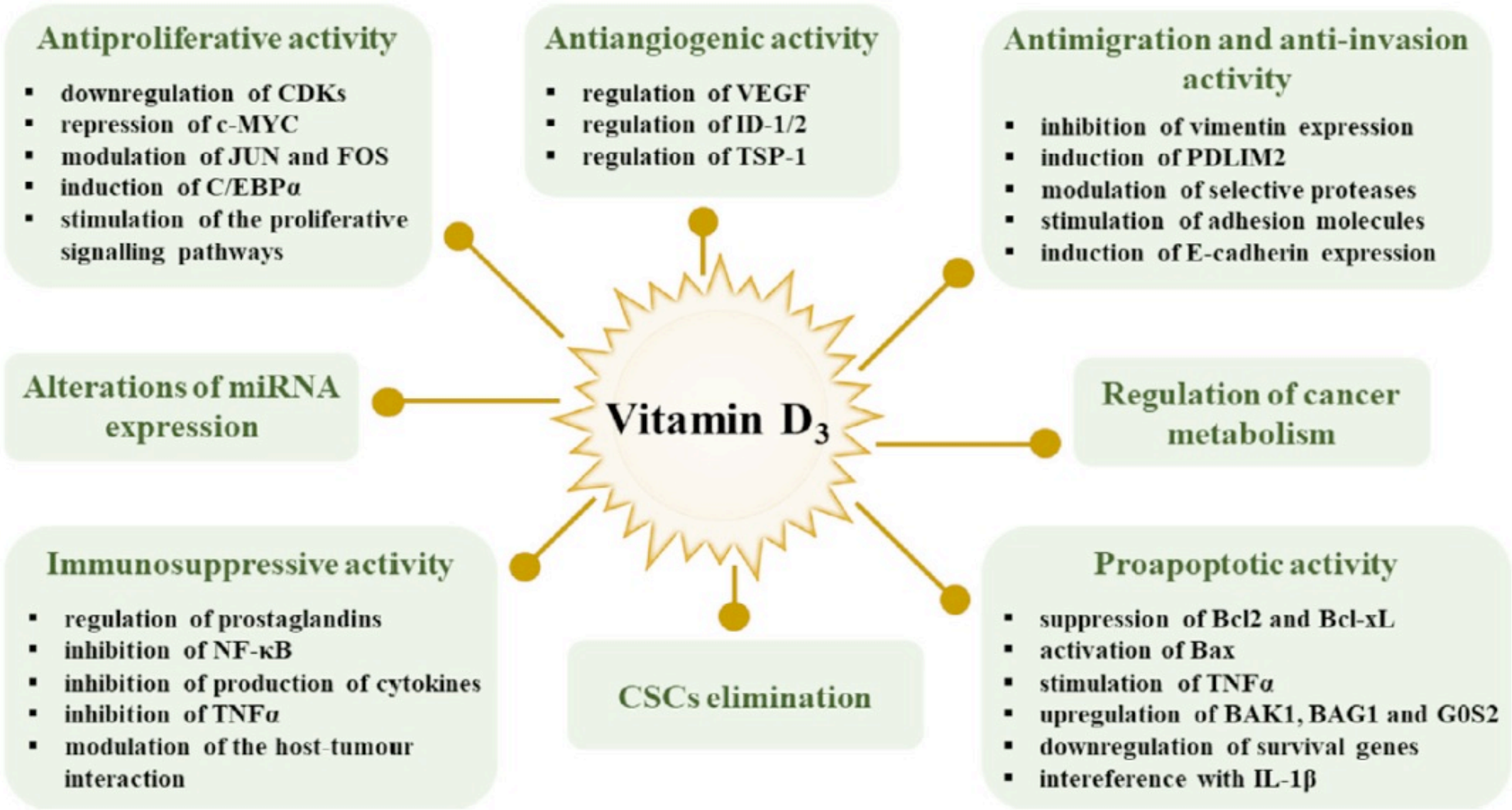

Fig. 1. Anticancer activity of vitamin D_3 in solid tumors.

Role of vitamin D_3 in selected malignant neoplasms. Nutrition. 2020 Nov-Dec;79-80:110964

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Flaxseed

Clinical Cancer Research

Cancer Therapy: Clinical

Dietary Flaxseed Alters Tumor Biological Markers in Postmenopausal Breast Cancer

Lilian U. Thompson, Jian Min Chen, Tong Li, Kathrin Strasser-Weippl, and Paul E. Goss

DOI: 10.1158/1078-0432.CCR-04-2326 Published May 2005

- Dietary flaxseed has the potential to reduce tumor growth in patients with breast cancer.
- Reductions in Ki-67 labeling index (34.2%; P = 0.001)
- Reductions in c-erbB2 expression (71.0%; P = 0.003)
- Increase in apoptosis

Anti- Her2-*neu*!

Dietary flaxseed alters tumor biological markers in postmenopausal breast cancer. Clin Cancer Res. 2005 May 15;11(10):3828-35.

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frontiers in Nutrition

REVIEW
published: 07 February 2018
doi: 10.3389/fnut.2018.00004

Check for updates

The Effect of Flaxseed in Breast Cancer: A Literature Review

Ana Calado[1], Pedro Miguel Neves[2], Teresa Santos[3,4,5] and Paula Ravasco[2]*

[1] Instituto de Ciências da Saúde, Universidade Católica Portuguesa, Lisbon, Portugal, [2] Faculdade de Medicina da Universidade de Lisboa, Hospital Universitário de Santa Maria and Centro de Investigação Interdisciplinar em Saúde da Universidade Católica Portuguesa, Lisbon, Portugal, [3] Faculdade de Motricidade Humana (FMH) (Projecto Aventura Social-Social Adventure Team), Universidade de Lisboa, Lisbon, Portugal, [4] Instituto de Saúde Ambiental (ISAMB)

- α-linolenic acids in flaxseed have been shown to be able to suppress growth, size, and proliferation of cancer cells & also to promote breast cancer cell death
- The intake of **flaxseed combined with tamoxifen** can **reduce tumor size to a greater extent than taking tamoxifen alone.**

The Effect of Flaxseed in Breast Cancer: A Literature Review. Front Nutr. 2018 Feb 7;5:4

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molecules

MDPI

Review

Mechanistic Insights into the Pharmacological Significance of Silymarin

Karan Wadhwa [1], Rakesh Pahwa [2], Manish Kumar [3], Shobhit Kumar [4], Prabodh Chander Sharma [5], Govind Singh [1], Ravinder Verma [6], Vineet Mittal [1], Inderbir Singh [7], Deepak Kaushik [1,*] and Philippe Jeandet [8,*]

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* Correspondence: deepkaushik1977@gmail.com (D.K.); philippe.jeandet@univ-reims.fr (P.J.)

Mechanistic Insights into the Pharmacological Significance of Silymarin. Molecules. 2022 Aug 21;27(16):5327

Tablet/ Supplement	Amount	Breakfast	Lunch	Dinner	Bedtime	Notes
10% in 400iu gamma tocopherol vit E			yes			Protect Liver if using high dose green tea (EGCG)
Asprin	75 mg		Yes			Synergistic with Omega 3
Berberine	500mg					. Stop 3 days b4 scan and 2 days after
Black seed Oil	100Omg	Yes	Yes	Yes		
Broccoli Ultra (sulforaphane)	600 mg	Yes		Yes		
Chaga Mushrooms	2 capsules	Yes		Yes		Take magnesium citrate to stop kidney stones
Coq 10 ubiquinol	100 mg					
Curcumin	500 mg	Yes		Yes		
Ellagic Acid			Yes			Take approx. 4 hours
Garcinia (hydroxy citrate)	1000 mg	Yes				
EGCG	400mg	Yes	Yes	Yes		
Indole – 3 Carbinol 13c (DIM)	300 mg		Yes	Yes		
Lions' mane	400 mg		Yes			
Loratadine	10mg		Yes			
Magnesium citrate	300 mg	Yes				
Melatonin	120 mg					
Milk thistle	500mg x 2	Yes				
Omega 3 EPA	700mg x2	yes				
Pectasol power I teaspoon						ach up to three times a day
Quercetin	1000 mg					with resveratrol
R alpha lipoic acid	300					Stop 24 hour before chemo
Reishi						
Resveratrol 500mg	5					
Vit d3 K2	30			es		
Wheat germ (metatrol)	2 ta					One month on one month off expensive not currently taking
Bio. Me Prebio PHGG	I teasp					Take first thing
Block buster all clear	2 Tablet			yes		Take on empty stomach
Zinc	60mg	Yes				
Vitamin C	30000mg	Yes		Yes		Pulse weekly
Lactoferrin	250mg	yes				
Seabuck thorn oil omegs 7	300 mg	yes				Stopped taking this week
Pysllum husk	1400 mg			yes		
Haritaki	1000 mg	Yes	Yes	Yes		Take on empty stomacj
Fucoidia	500mg	yes		tes		
Bio Kult		yes				
Atresimin	500mg		Yes			
Akermansia	400mg		yes			

What to take?... Why?... When?... The right dose!

- I have metformin /LDN /propranolol /simvastatin/ mebendazole / doxycycline here at home but currently not taking any.

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Seminars in Cancer Biology 73 (2021) 45–57

Contents lists available at ScienceDirect

Seminars in Cancer Biology

journal homepage: www.elsevier.com/locate/semcancer

Effects of caloric restriction on immunosurveillance, microbiota and cancer cell phenotype: Possible implications for cancer treatment

Francesca Pistollato [a,1], Tamara Yuliett Forbes-Hernandez [b,1], Ruben Calderón Iglesias [a], Roberto Ruiz [a], Maria Elexpuru Zabaleta [a], Irma Dominguez [c,d], Danila Cianciosi [e], Josè L. Quiles [f], Francesca Giampieri [e,g,h,*], Maurizio Battino [e,i,*]

[a] Centre for Nutrition and Health, Universidad Europea del Atlántico (UEA), Santander, Spain
[b] Nutrition and Food Science Group, Department of Analytical and Food Chemistry, CITACA, CACTI, University of Vigo, Vigo, Spain
[c] Universidad Internacional Iberoamericana (UNINI), Campheee, Mexico
[d] Universidade Internacional do Cuanza, Cuito, Angola

F. Pistollato et al. Effects of caloric restriction on immunosurveillance, microbiota and cancer cell phenotype: Possible implications for cancer treatment. Seminars in Cancer Biology 73 (2021) 45–57

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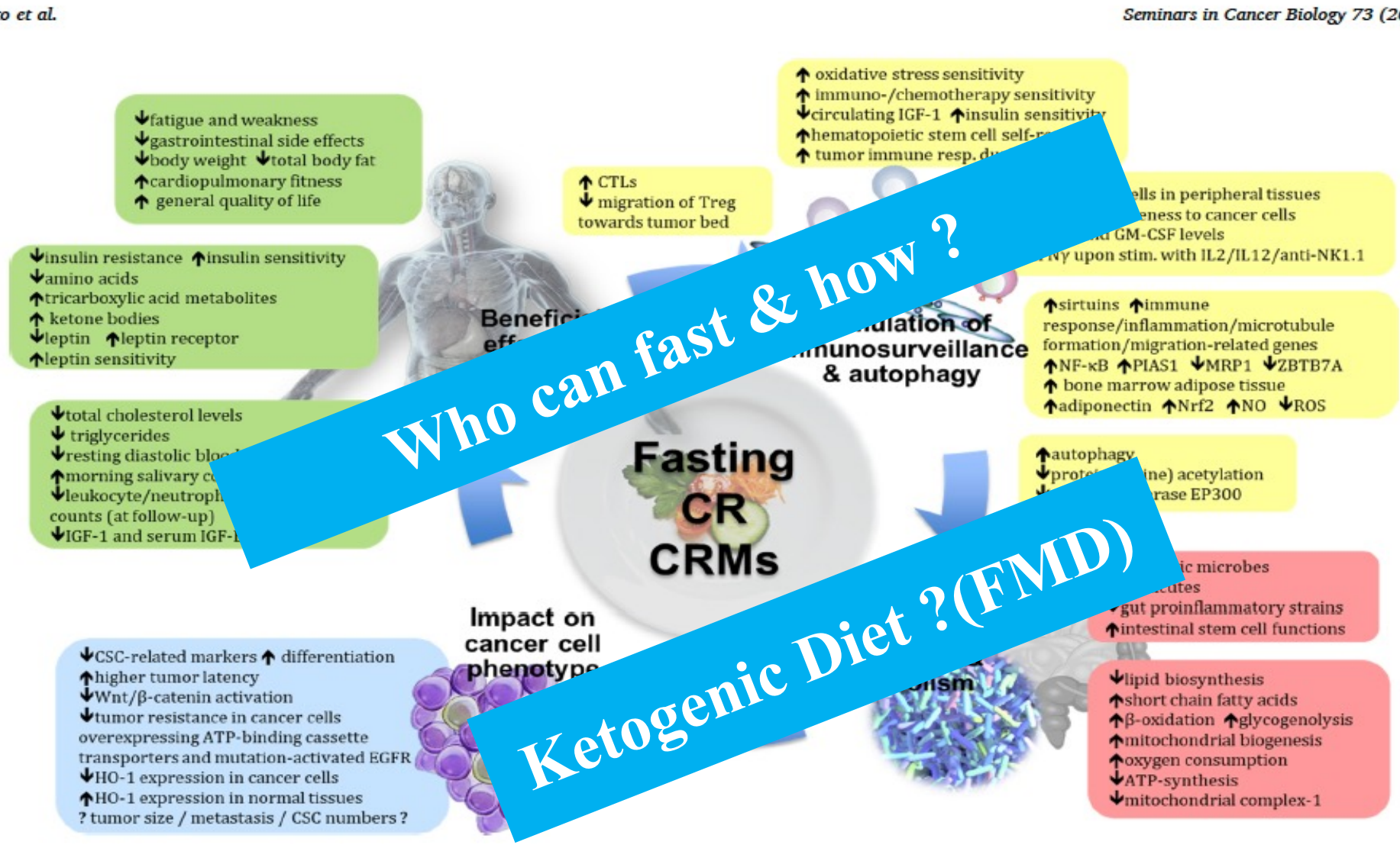

Who can fast & how ?

Ketogenic Diet ?(FMD)

F. Pistollato et al. Effects of caloric restriction on immunosurveillance, microbiota and cancer cell phenotype: Possible implications for cancer treatment. Seminars in Cancer Biology 73 (2021) 45–57

What do you want to do exactly?!

G O- TO- I T

- **Individualized, Tailored & Integrative Cancer treatments are crucial.**
- **Analyzing Genes, how they are expressed in <u>each</u> patient.**
- **Optimizing their lifestyle modifiable factors.**
- **Looking at the <u>Person</u> & not the Tumor.**

More to come about Metabolic Health & Cancer Recovery

AWARE CLINIC

Thank you ☺ !

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www.awareclinic.com/recoveryfundamentals/