

Exercise Medicine
Research Institute

Precision Exercise Medicine in the Treatment of Prostate Cancer

Creative
thinkers
made here.

Robert U. Newton, PhD, DSc, AEP
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Exercise alters the chemical, immunological, thermal & physical environment of every cell, tissue, organ and system in the body

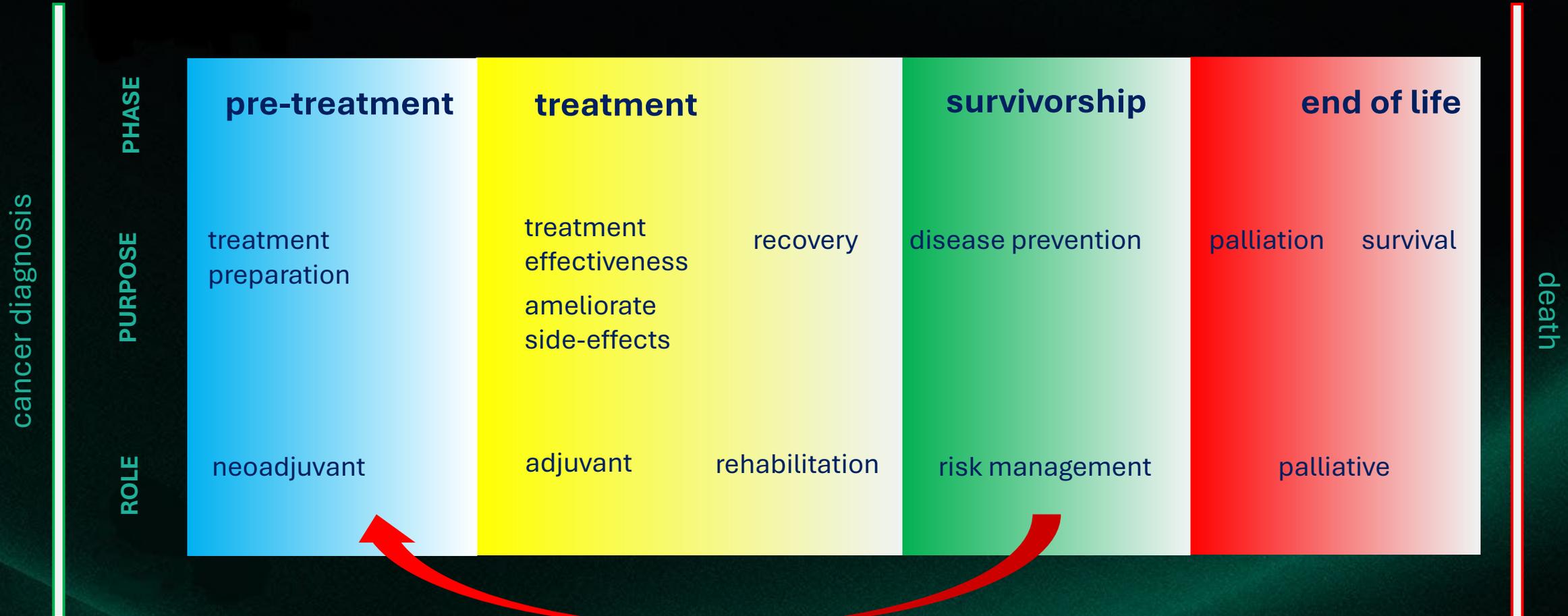
Different types and dosages have vastly different effects

This “endogenous medicine” developed over millions of years works in perfect synchrony

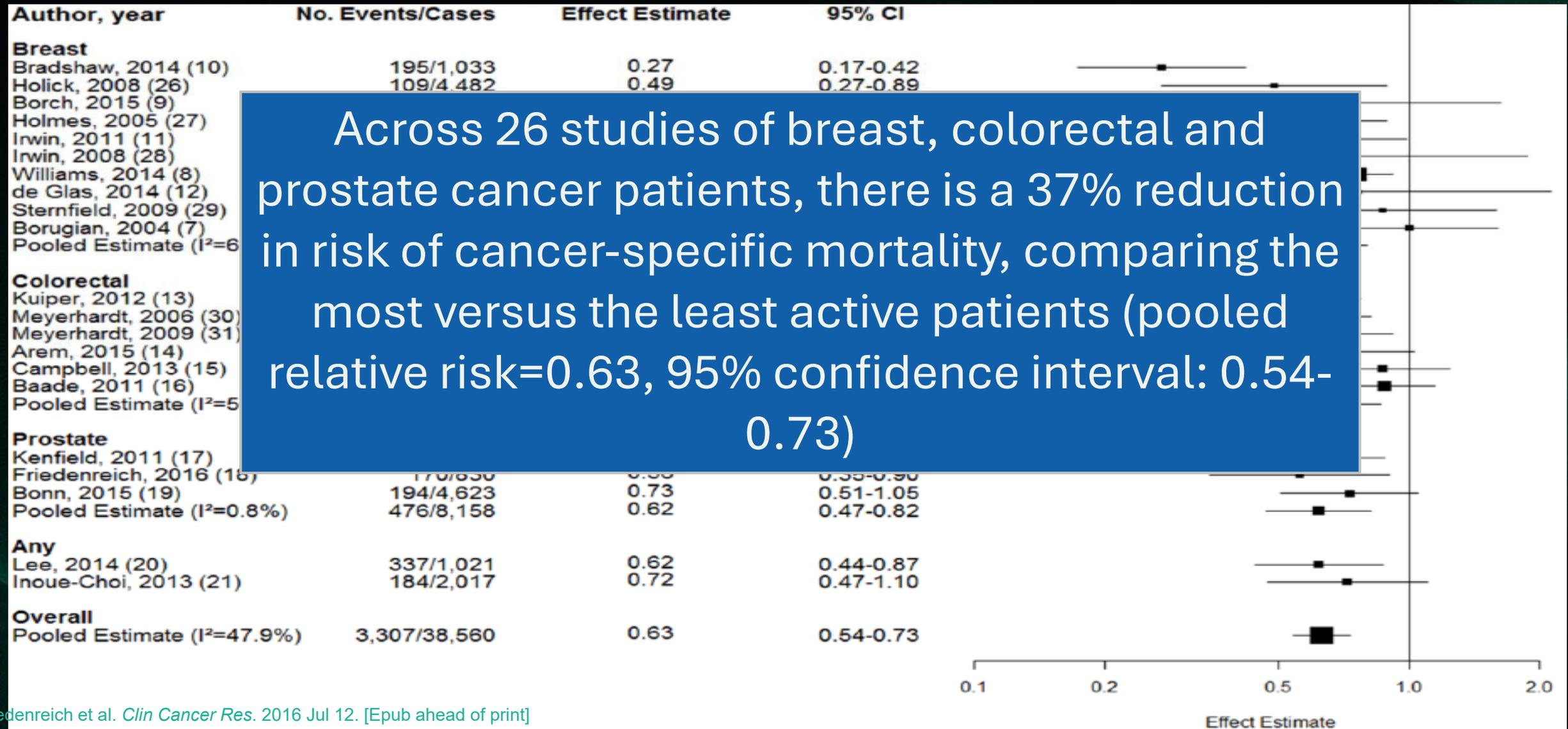
Exercise oncology is the research and clinical application to people with cancer

Exercise Medicine

Neoadjuvant – Adjuvant – Rehabilitative – Palliative



Prospective cohort studies of post diagnosis Exercise and Cancer Specific Mortality



Compared to other therapies

- Data from these studies suggest a reduced risk of recurrence or death of 50% to 60%

Exercise is NOT an alternative to primary cancer therapies but rather a critical synergistic medicine

advance and

turning point in eliminating suffering and death from cancer.”

Prospective RCT's Exercise and Survival

The Colon Health and Life-Long
Exercise Change trial: a randomized
trial of the National Cancer Institute
of Canada Clinical Trials Group

K.S. Courneya PhD, C.M. Booth MD,† S. Gill MD,‡
P. O'Brien MSc,† J. Vardy MD PhD,§
C.M. Friedenreich PhD,|| H.J. Au MD,#
M.D. Brundage MD,† D. Tu PhD,† H. Dhillon MA,§
and R.M. Meyer MD†*

CURRENT ONCOLOGY—VOLUME 15, NUMBER 6

STUDY PROTOCOL **Open Access**

Physical Exercise Training versus Relaxation in
Allogeneic stem cell transplantation (PETRA
Study) – Rationale and design of a randomized
trial to evaluate a yearlong exercise
intervention on overall survival and side-effects
after allogeneic stem cell transplantation

Joachim Wiskemann^{1,2,3*}, Rea Kuehl^{1,2*}, Peter Dreger⁴, Gerhard Huber⁵, Nikolaus Kleindienst³,
Cornelia M. Ulrich⁶ and Martin Bohus^{3,7}

Wiskemann *et al.* *BMC Cancer* (2015) 15:619
DOI 10.1186/s12885-015-1631-0

BMJ Open Intense Exercise for Survival among Men with Metastatic Castrate-Resistant Prostate Cancer (INTERVAL-GAP4): a multicentre, randomised, controlled phase III study protocol

Robert U Newton,^{1,2,3} Stacey A Kenfield,⁴ Nicolas H Hart,^{1,3,5} June M Chan,^{4,6}
Kerry S Courneya,^{1,7} James Catto,⁸ Stephen P Finn,⁹ Rosemary Greenwood,¹⁰
Daniel C Hughes,¹¹ Lorelei Mucci,¹² Stephen R Plymate,¹³ Stephan F E Praet,^{13,14}
Emer M Guinan,¹⁵ Erin L Van Blarigan,⁶ Orla Casey,¹⁵ Mark Buzza,¹⁶ Sam Gledhill,¹⁶
Li Zhang,^{6,17} Daniel A Galvão,^{1,3} Charles J Ryan,^{4,17,18} Fred Saad¹⁹

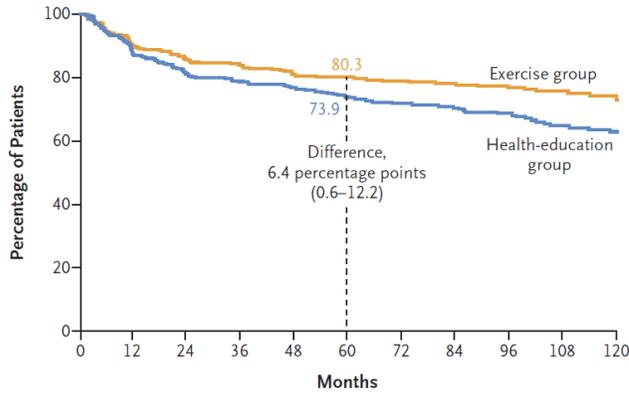
Newton RU, *et al.* *BMJ Open* 2018;**8**:e022899. doi:10.1136/bmjopen-2018-022899

BMJ Open Exercise during Chemotherapy for Ovarian cancer (ECHO) trial: design and implementation of a randomised controlled trial

Sandra Hayes ,^{1,2,3} Andreas Obermair,⁴ Linda Mileskin,⁵ Alison Davis,⁶
Louisa G Gordon ,⁷ Elizabeth Eakin,⁹ Monika Janda ,⁹
Vanessa L Beesley,^{10,11,12} Elizabeth H Barnes,³ Rosalind Renee Spence ,¹
Carolina Sandler,^{1,13} Tamara Jones,^{1,14} Dimitrios Vagenas,² Penny Webb,¹⁰
John Andrews,³ Alison Brand,¹⁵ Yeh Chen Lee,^{3,16} Michael Friedlander,¹⁶
Kate Pumpa,¹⁷ Helene O'Neill,¹⁸ Merran Williams,¹⁸ The ECHO Collaborative,
Martin Stockler ³

Hayes S, *et al.* *BMJ Open* 2023;**13**:e067925. doi:10.1136/bmjopen-2022-067925

A Disease-free Survival

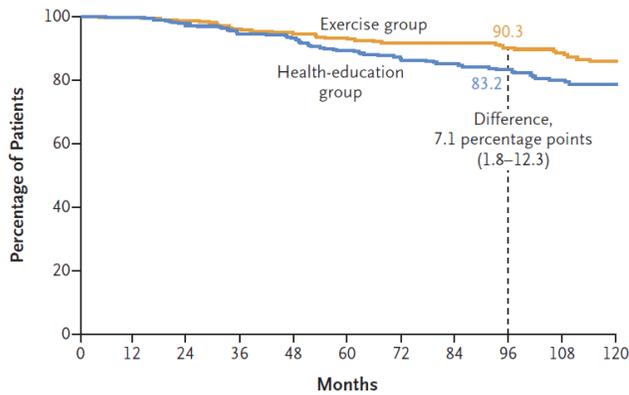


	Total Patients	Patients with Disease Recurrence, New Primary Cancer, or Death no.
Exercise Group	445	93
Health-Education Group	444	131

Hazard ratio, 0.72 (95% CI, 0.55–0.94)
2-sided P=0.02

No. of Patients	445	378	336	301	278	254	229	190	159	119	58
Exercise group											
Health-education group	444	374	326	295	272	239	213	178	142	107	53

B Overall Survival



	Total Patients	Patients Who Died no.
Exercise Group	445	41
Health-Education Group	444	66

Hazard ratio, 0.63 (95% CI, 0.43–0.94)

No. of Patients	445	428	397	349	331	298	267	225	188	141	71
Exercise group											
Health-education group	444	431	394	359	335	294	260	218	176	134	59

Figure 2. Disease-free and Overall Survival (Intention-to-Treat Population).

Shown is the probability of disease-free survival according to investigator assessment (Panel A) and overall survival (Panel B) in the exercise group and the health-education group.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Structured Exercise after Adjuvant Chemotherapy for Colon Cancer

Published June 1, 2025 | N Engl J Med 2025;393:13-25 | DOI: 10.1056/NEJMoa2502760 | VOL. 393 NO. 1

Disease-Free Survival (DFS)

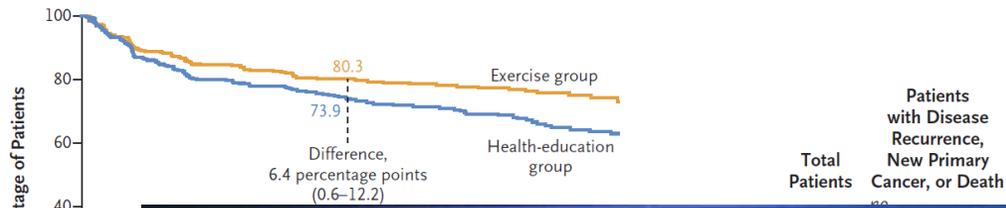
Primary endpoint: Time to recurrence, new primary cancer, or death.

Median follow-up of **7.9 years**, the exercise group had a **28% lower risk of disease recurrence, new cancers, or death** (hazard ratio [HR] = 0.72; 95% CI, 0.55–0.94; P = 0.02)

Overall Survival (OS)

HR for death: 0.63 (95% CI, 0.43–0.94), indicating a **37% reduction in risk of death** for the exercise group

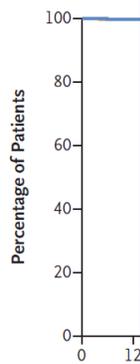
A Disease-free Survival



No. of Patients

Exercise group	445	378
Health-education group	444	374

B Overall Survival



No. of Patients

Exercise group	445	428
Health-education group	444	431

Figure 2. Disease-free and Overall Survival
Shown is the probability of disease-free survival for the exercise group and the health-education group.



ASCO June 2025

Putting CO.21 Effect Size on Context

Intervention	Disease	Absolute OS Gain
Adjuvant Exercise	Colon	7% at 8 years
Adjuvant Oxaliplatin	Colon	5% at 10 years
Adjuvant Osimertinib	NSCLC	8% at 5 years
Consolidation Durvalumab	NSCLC	10% at 5 years
Adjuvant Trastuzumab	Breast	5% at 5 years
Peri-op Pembrolizumab	TNBC	5% at 5 years
Adjuvant Pertuzumab	Breast	1.8% at 10 years

37% reduction in risk of death for the exercise group

Adjuvant
Cancer

02760 | VOL. 393 NO.1

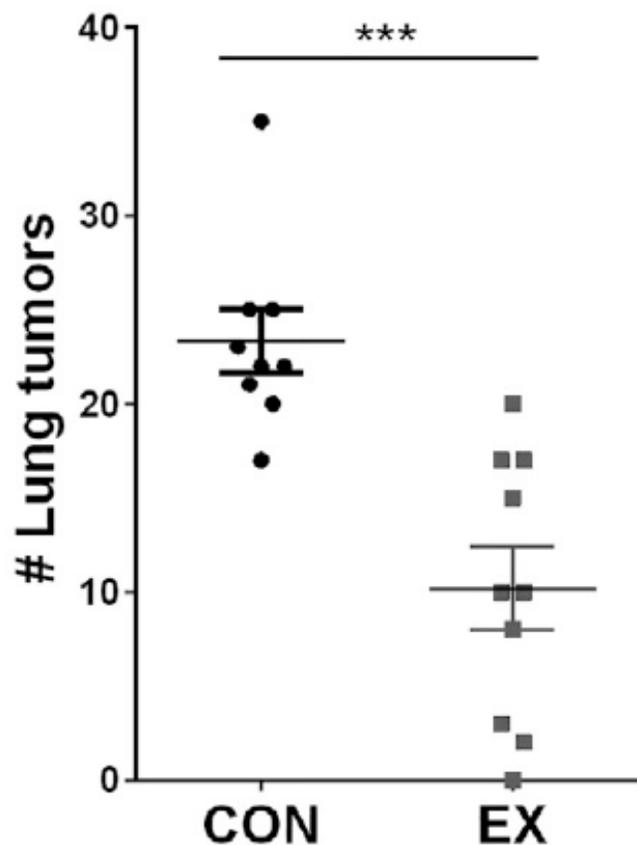
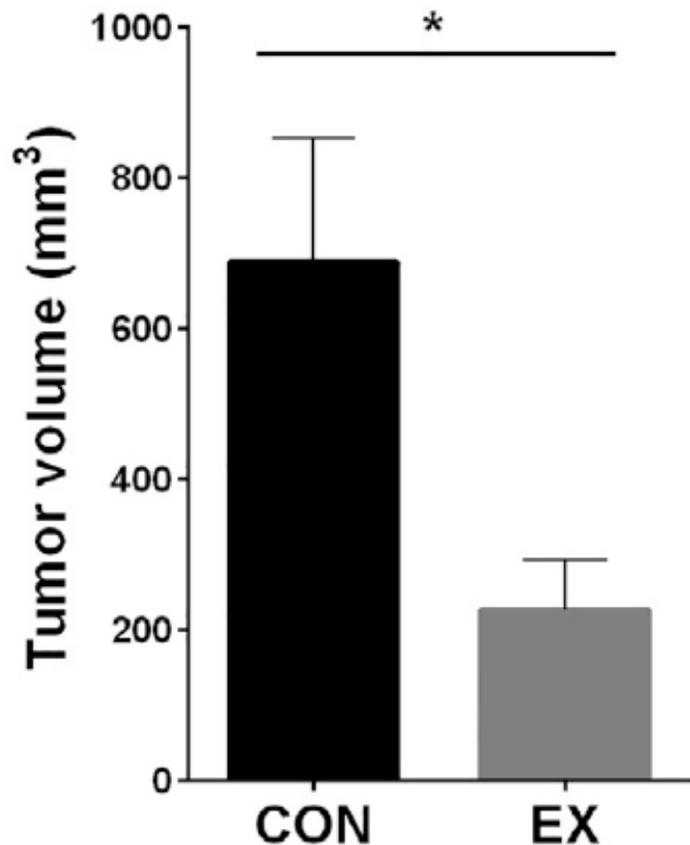
new primary

exercise
recurrence,
R] = 0.72; 95%

indicating a

Exercise induced immunotherapy

- Improved immune function through increased cell surveillance, activation, and infiltration by the innate system.



Voluntary Running Suppresses Tumor Growth through Epinephrine- and IL-6-Dependent NK Cell Mobilization and Redistribution

Line Pedersen,¹ Manja Idorn,² Gitte H. Olofsson,² Britt Lauenborg,¹ Intawat Nookaew,^{3,4} Rasmus Hvass Hansen,⁵ Helle Hjorth Johannesen,⁵ Jürgen C. Becker,⁶ Katrine S. Pedersen,¹ Christine Dethlefsen,¹ Jens Nielsen,³ Julie Gehl,⁷ Bente K. Pedersen,¹ Per thor Straten,^{2,8} and Pernille Hojman^{1,7,*}

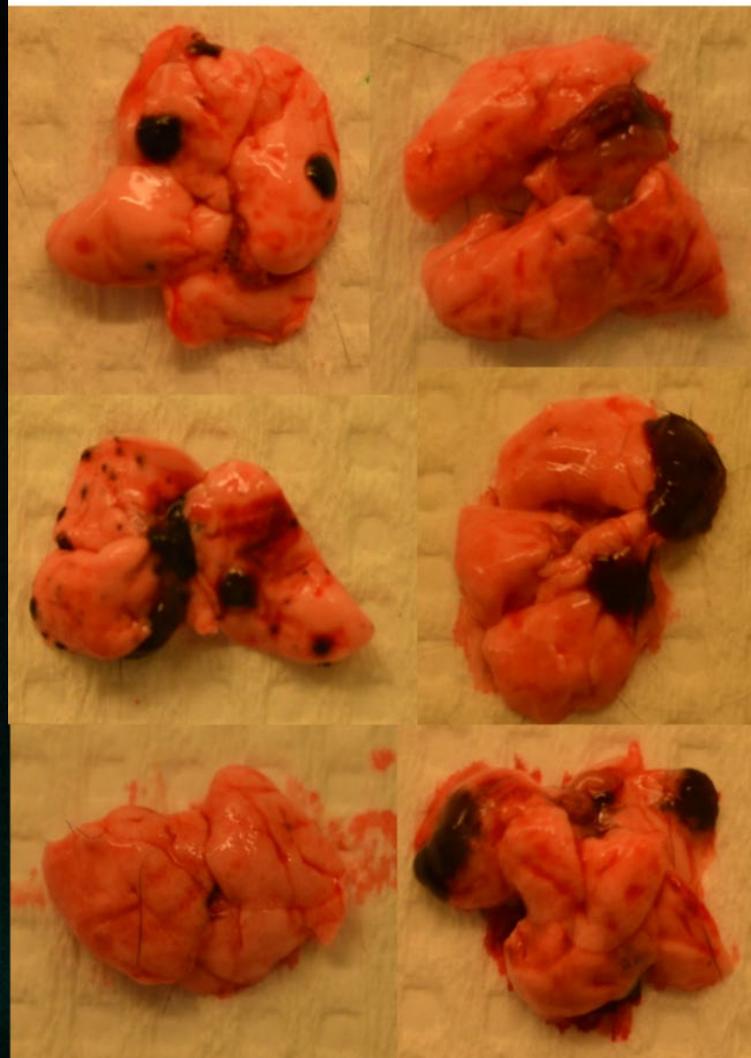
Cell Metabolism (2016), <http://dx.doi.org/10.1016/j.cmet.2016.01.011>

EXERCISE INDUCED IMMUNOTHERAPY

CON



EX



Voluntary Running Suppresses Tumor Growth through Epinephrine- and IL-6-Dependent NK Cell Mobilization and Redistribution

Line Pedersen,¹ Manja Idom,² Gitte H. Olofsson,² Britt Lauenborg,¹ Intawat Nookaew,^{3,4} Rasmus Hvass Hansen,⁵ Helle Hjorth Johannesen,⁵ Jürgen C. Becker,⁶ Katrine S. Pedersen,¹ Christine Dethlefsen,¹ Jens Nielsen,³ Julie Gehl,⁷ Bente K. Pedersen,¹ Per thor Straten,^{2,8} and Pernille Hojman^{1,7,*}

Cell Metabolism (2016), <http://dx.doi.org/10.1016/j.cmet.2016.01.011>

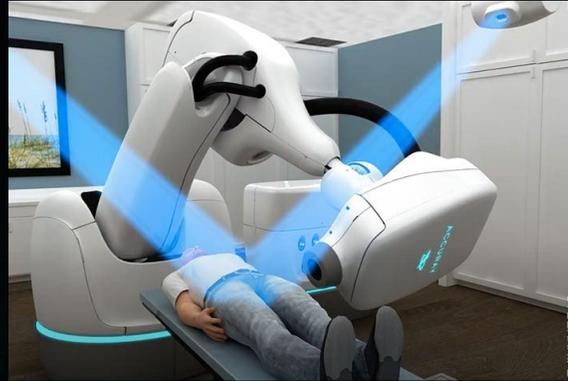
Multi-therapy facilitation

Surgery



- Suppress progression
- Increase resilience
- Less complications
- Rehabilitation

Radiation therapy



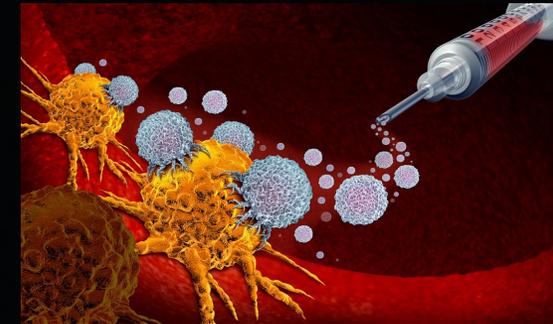
- Reduce hypoxia
- Enhance immune response
- Less side effects

Chemotherapy



- Enhance delivery
- Reduced toxicities

Immunotherapy

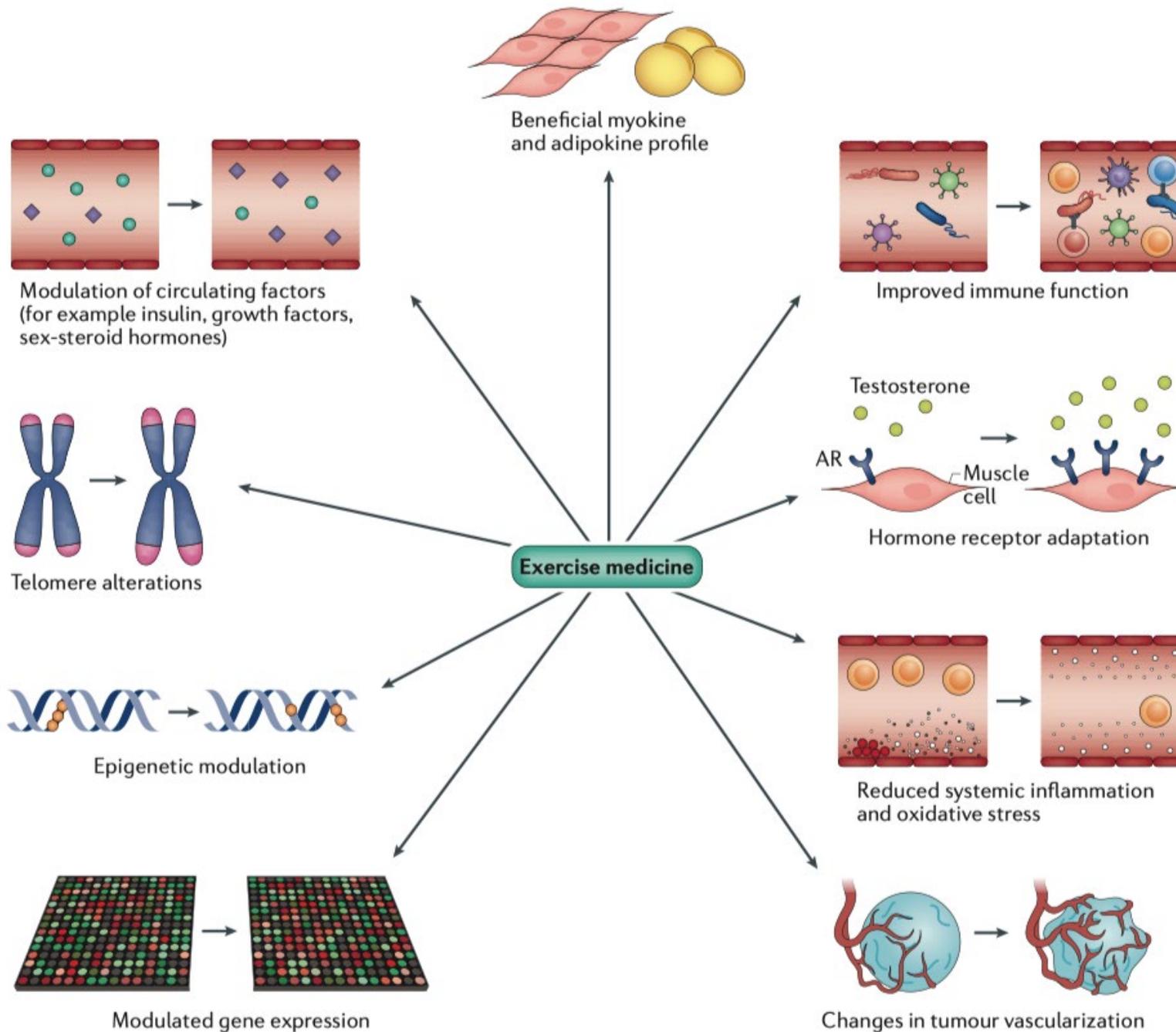


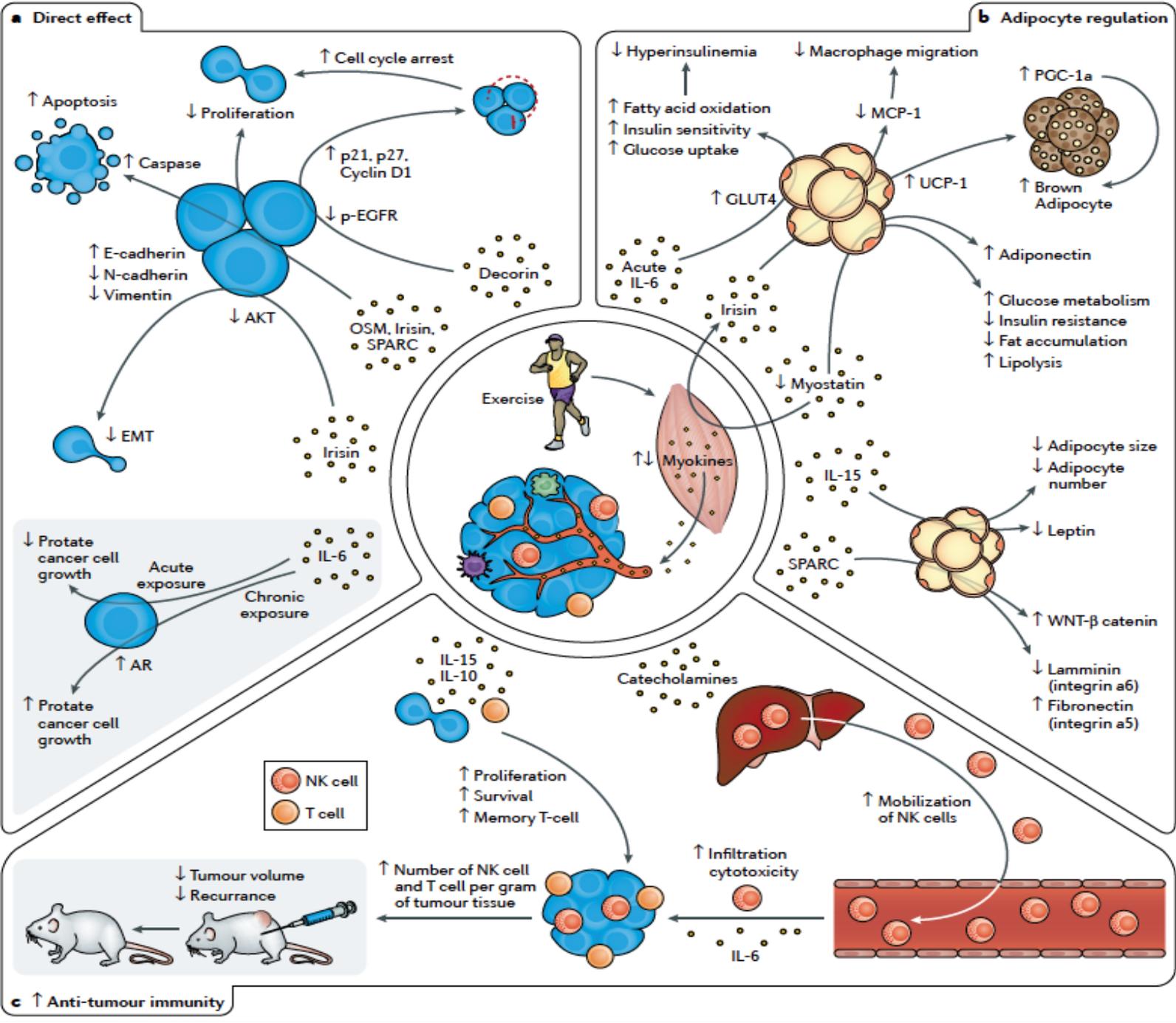
- More and better immune cells harvested
- Enhanced delivery
- Improved immune response

Enhancing active surveillance of prostate cancer: the potential of exercise medicine

Daniel A. Galvão¹, Dennis R. Taaffe^{1,2}, Nigel Spry^{1,3}, Robert A. Gardiner^{1,4,5}, Renea Taylor⁶, Gail P. Risbridger⁷, Mark Frydenberg⁸, Michelle Hill⁹, Suzanne K. Chambers^{1,10}, Phillip Stricker¹¹, Tom Shannon¹², Dickon Hayne¹³, Eva Zopf^{1,14} and Robert U. Newton^{1,4}

Nat Rev Urol 13, 258–265 (2016). <https://doi.org/10.1038/nrurol.2016.46>





NATURE REVIEWS | UROLOGY

Exercise-induced myokines and their effect on prostate cancer

Jin-Soo Kim^{1,2}, Daniel A. Galvão^{1,2}, Robert U. Newton^{1,2}, Elin Grey² and Dennis R. Taaffe^{1,2}

Nat Rev Urol 18, 519–542 (2021).

<https://doi.org/10.1038/s41585-021-00476-y>



TABLE 2 Changes in testosterone, PSA, haemoglobin and bone marker levels, body composition and bone mass, after 36 weeks of ADT for 68 men

Mean (SEM) variable	Baseline	36 weeks	% change	P
Testosterone, pg/mL	15.1 (0.6)	0.80 (0.03)	<u>-93.3 (0.3)</u>	<0.001
PSA, ng/mL	22.6 (3.1)	0.23 (0.05)	<u>-98.2 (0.5)</u>	<0.001
Haemoglobin, g/L	145.2 (1.5)	131.9 (1.5)	-8.8 (0.9)	<0.001
Bone markers				
Serum osteocalcin*, ng/mL	4.7 (0.05)	7.4 (0.7)	341.0 (111.2)	0.002
Alkaline phosphatase†, IU/L	89.0 (6.1)	99.5 (7.1)	13.5 (3.0)	0.001
Urine calcium/creatinine ratio†	240.4 (24.6)	415.3 (39.11)	101.5 (12.2)	<0.001
Urine calcium excretion, mg†	21.2 (2.4)	35.3 (3.6)	94.0 (12.0)	<0.001
Body composition and bone mass				
Lean tissue mass, kg				
LM	55.8 (0.8)	54.4 (0.8)	-2.4 (0.4)	<0.001
UL	6.3 (0.1)	5.9 (0.1)	-5.6 (0.6)	<0.001
LL	17.1 (0.2)	16.4 (0.2)	-3.7 (0.5)	<0.001
Trunk	28.8 (0.4)	28.3 (0.4)	-1.4 (0.5)	0.009
ASM	23.4 (0.3)	22.4 (0.3)	<u>-4.2 (0.5)</u>	<0.001
Fat mass, kg				
FM	20.8 (0.7)	23.1 (0.7)	13.8 (2.3)	<0.001
UL	2.1 (0.1)	2.5 (0.1)	20.7 (3.3)	<0.001
LL	5.5 (0.2)	6.4 (0.2)	18.7 (2.7)	<0.001
Trunk	12.13 (0.4)	13.1 (0.4)	12.0 (2.5)	<0.001
Body fat, %	25.8 (0.6)	28.5 (0.7)	2.6 (0.3)	<0.001
BMD, g/cm²				
WB	1.164 (0.014)	1.145 (0.014)	<u>-2.4 (0.3)</u>	<0.001
UL	1.732 (0.015)	1.708 (0.015)	-1.3 (0.3)	<0.001
LL	2.576 (0.038)	2.559 (0.041)	-0.6 (0.4)	0.173
Total hip†	1.021 (0.018)	1.001 (0.018)	-1.5 (0.5)	<0.001
Spine†	1.123 (0.024)	1.086 (0.023)	<u>-3.9 (0.4)</u>	<0.001

No. of patients *63, †62; ‡69.

Changes in muscle, fat and bone mass after 36 weeks of maximal androgen blockade for prostate cancer

Daniel A. Galvão^{1,2}, Nigel A. Spry^{3,4}, Dennis R. Taaffe⁵, Robert U. Newton^{1,2}, John Stanley⁶, Tom Shannon⁶, Chris Rowling⁷ and Richard Prince^{3,4}

2008 BJU INTERNATIONAL | 102, 44–47 | doi:10.1111/j.1464-410X.2008.07539.x

Testosterone ↓

PSA ↓

but...

Lean mass ↓

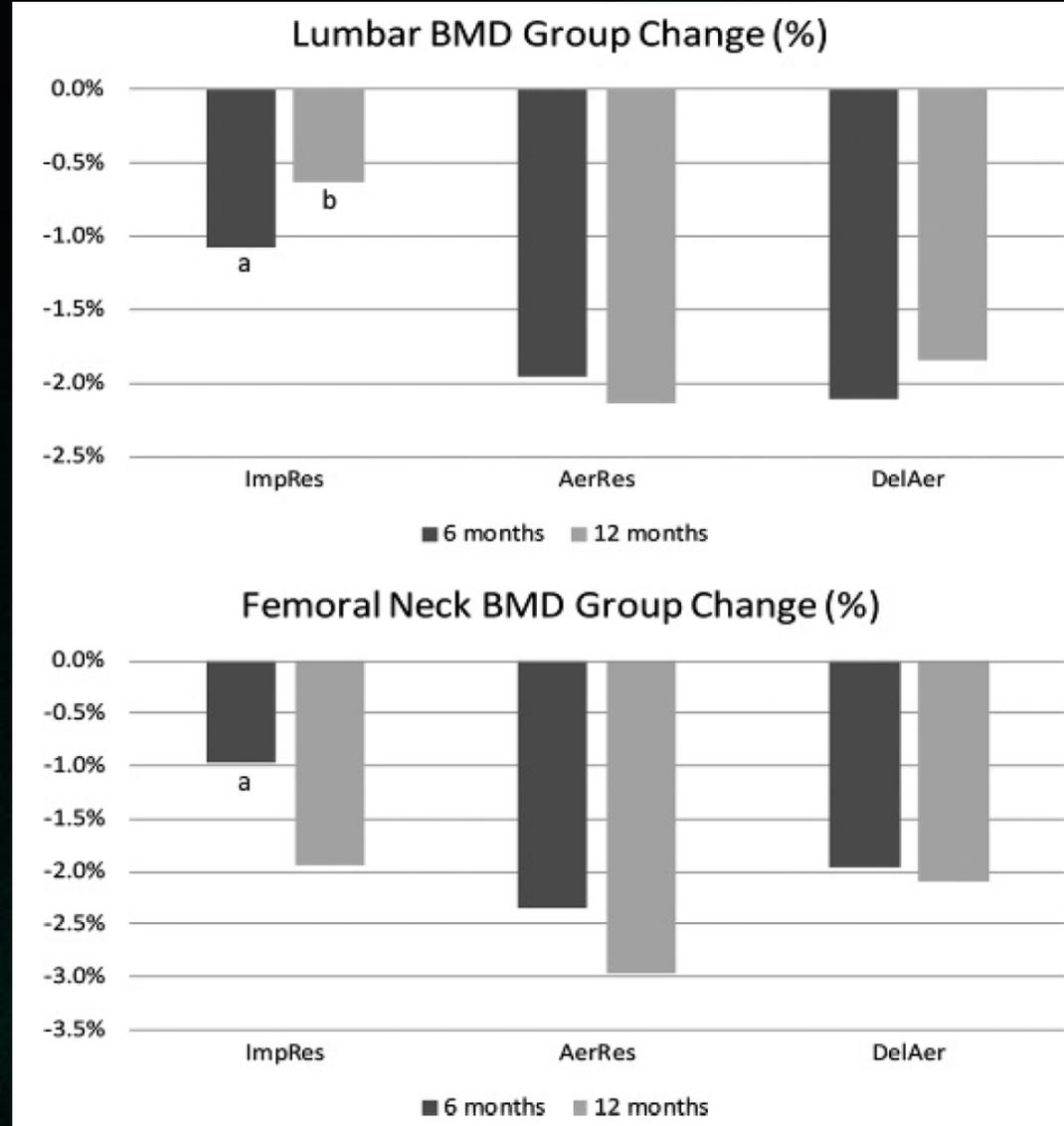
Fat mass ↑

Bone mineral density ↓

Impact Exercise for Bone Health



Lumbar spine BMD (% change over 6 months)



NEWTON, R. U., D. A. GALVAO, N. SPRY, D. JOSEPH, S. K. CHAMBERS, R. A. GARDINER, B. A. WALL, K. A. BOLAM, and D. R. TAAFFE. Exercise Mode Specificity for Preserving Spine and Hip Bone Mineral Density in Prostate Cancer Patients. *Med. Sci. Sports Exerc.*, Vol. 51, No. 4, pp. 607–614, 2019.



Metastatic Prostate Cancer



Cancer spread beyond the prostate gland

Stage 4 disease

Predominantly osteoblastic (bone-forming).

Much more difficult to treat

5-year relative survival rate plummets

"super anti-androgens"

Radiation therapy

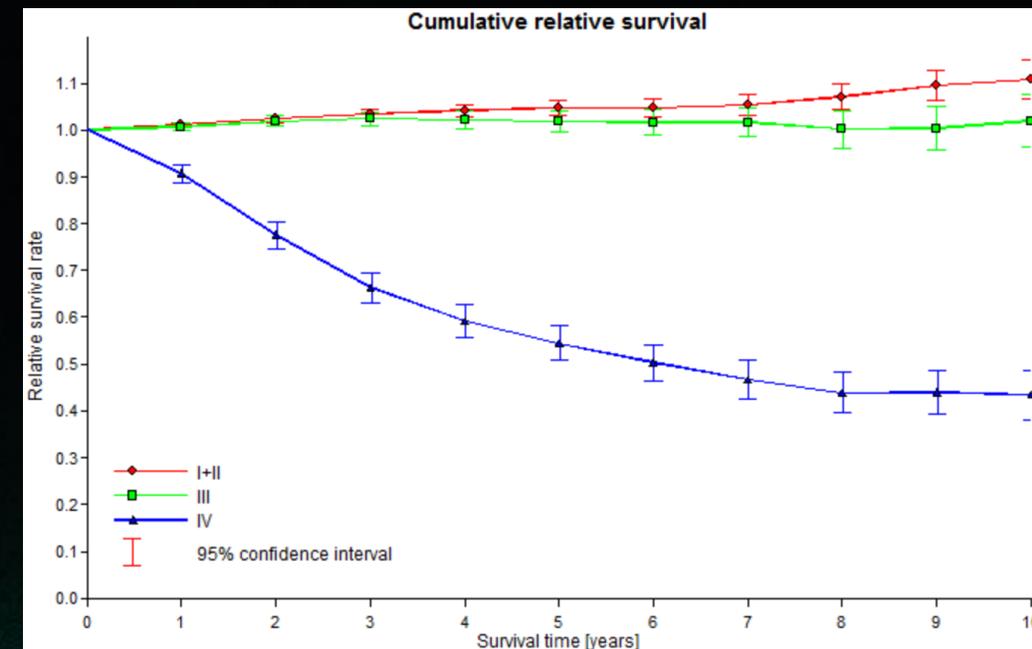
Chemotherapy

Side effects are considerable

QOL and function become paramount

Recommendation up to 2011 – "avoid physical activity in particular resistance exercise"

Patients were not doing well



METASTATIC DISEASE

Exercise Preserves Physical Function in Prostate Cancer Patients with Bone Metastases

DANIEL A. GALVÃO^{1,2}, DENNIS R. TAAFFE^{1,2,3}, NIGEL SPRY^{1,4,5}, PRUE CORMIE⁶, DAVID JOSEPH^{1,4,5,7}, SUZANNE K. CHAMBERS^{1,8,9,10}, RAPHAEL CHEE^{1,4}, CAROLYN J. PEDDLE-MCINTYRE^{1,2}, NICOLAS H. HART^{1,2}, FREERK T. BAUMANN¹¹, JAMES DENHAM¹², MICHAEL BAKER¹³, and ROBERT U. NEWTON^{1,2,14}
Med. Sci. Sports Exerc., Vol. 50, No. 3, pp. 393–399, 2018.



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TABLE 1. M3EP for PCa with bone metastases.

Bone Metastases Site	Exercise Mode					
	Resistance			Aerobic		Flexibility
	Upper	Trunk	Lower	Weight Bearing	Non-weight Bearing	Static
Pelvis	√	√	√ ^a		√	√ ^b
Axial skeleton (lumbar)	√		√		√	√ ^b
Axial skeleton (thoracic/ribs)	√ ^c		√	√	√	√ ^b
Proximal femur	√	√	√ ^a		√	√
All regions	√ ^c		√ ^a		√	√ ^b

√, Target exercise region.

^aExclusion of hip extension/flexion – inclusion of knee extension/flexion.

^bExclusion of spine/flexion/extension/rotation.

^cExclusion of shoulder flexion/extension/abduction/adduction – inclusion of elbow flexion/extension.

Weight bearing (e.g., walking); non-weight bearing (e.g., cycling).

- **EX completed 32±10 of 36 sessions (89% attendance)**
- **No exercise-related adverse events or skeletal fractures**
- Session perceived intensity 12.7±1.2 (6-20 scale)
- Perceived tolerance 5.5±1.1 (0-7 scale)
- CTC pain grade 0.2±0.3 (0-3 scale)
- **No bone pain assessed by FACT-BP (p=0.507)**

Measure	Baseline		3 months		Adjusted Change Mean (95% CI)	P-value
	EX (n=22)	CON (n=26)	EX (n=22)	CON (n=26)		
<i>Physical functioning</i> , NBS**	47.8 (6.8)	45.5 (8.2)	49.5 (5.0)	44.8 (7.8)	3.2 (0.4 to 6.0)	0.028
<i>Physical performance</i>						
Leg extension, kg (n=9, 12)	60.5 (16.2)	58.7 (15.8)	65.8 (14.4)	57.8 (14.1)	6.6 (0.6 to 12.7)	0.033

DELIBERATE LOADING OF BONE METS?

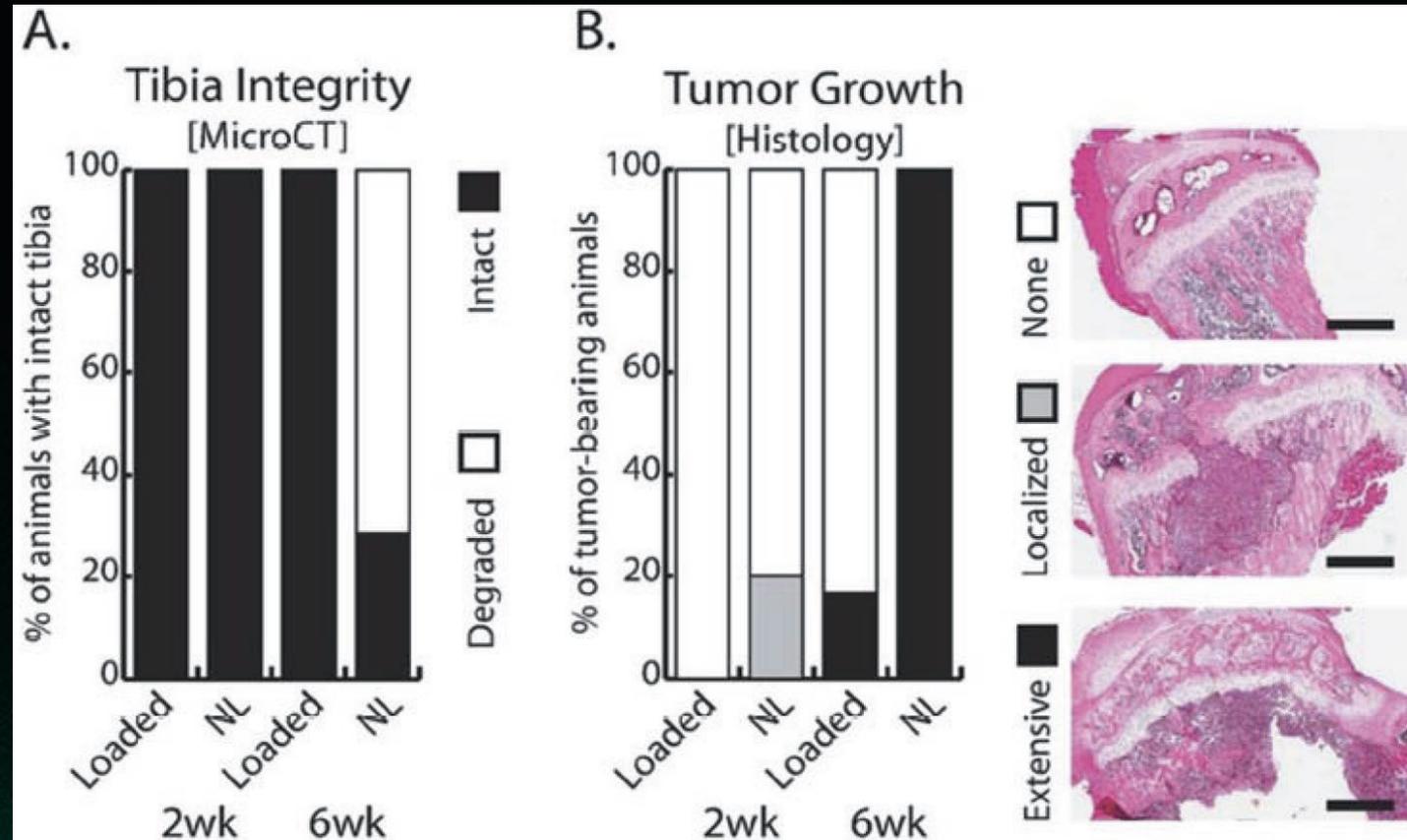
Original Article

In Vivo Tibial Compression Decreases Osteolysis and Tumor Formation in a Human Metastatic Breast Cancer Model[†]

Maureen E. Lynch, Ph.D.¹, Daniel Brooks, M.S.¹, Sunish Mohanan, DVM, DACVP², Min Joon Lee¹, Praveen Polamraju¹, Kelsey Dent, B.S.¹, Lawrence Bonassar, Ph.D.^{1,2}, Marjolein C. H. van der Meulen, Ph.D.^{1,3,4}, Claudia Fischbach, Ph.D.^{1,5}

Initial Date Submitted October 10, 2012; Date Revision Submitted March 1, 2013; Date Final Disposition Set April 15, 2013

Journal of Bone and Mineral Research
© 2013 American Society for Bone and Mineral Research
DOI 10.1002/jbmr.1966



DELIBERATE LOADING OF BONE METS?

“mechanical loading dramatically reduced osteolysis and tumor formation and increased tibial cancellous mass due to trabecular thickening”

Original Article

In Vivo Tibial Compression Decreases Osteolysis and Tumor Formation in a Human Metastatic Breast Cancer Model[†]

Maureen E. Lynch, Ph.D.¹, Daniel Brooks, M.S.¹, Sunish Mohanan, DVM, DACVP², Min Joon Lee¹, Praveen Polamraju¹, Kelsey Dent, B.S.¹, Lawrence Bonassar, Ph.D.^{1,2}, Marjolein C. H. van der Meulen, Ph.D.^{1,3,4}, Claudia Fischbach, Ph.D.^{1,5}

Initial Date Submitted October 10, 2012; Date Revision Submitted March 1, 2013; Date Final Disposition Set April 15, 2013

Journal of Bone and Mineral Research
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DOI 10.1002/jbmr.1966



Mechanical suppression of osteolytic bone metastases in advanced breast cancer patients: a randomised controlled study protocol evaluating safety, feasibility and preliminary efficacy of exercise as a targeted medicine



Nicolas H. Hart^{1,2,3*}, Daniel A. Galvão^{1,3}, Christobel Saunders^{4,5,6}, Dennis R. Taaffe^{1,3,10}, Kynan T. Feeney^{1,3,4,7}, Nigel A. Spry^{1,3,6,8}, Daphne Tsoi^{1,3,4,7}, Hilary Martin⁹, Raphael Chee^{1,3,6,8}, Tim Clay^{4,8}, Andrew D. Redfern^{6,9} and Robert U. Newton^{1,3,10}

BMJ Open Can exercise suppress tumour growth in advanced prostate cancer patients with sclerotic bone metastases? A randomised, controlled study protocol examining feasibility, safety and efficacy

Nicolas H Hart,¹ Robert U Newton,¹ Nigel A Spry,^{1,2,3} Dennis R Taaffe,¹ Suzanne K Chambers,^{1,4} Kynan T Feeney,^{1,5,8} David J Joseph,^{1,2,3} Andrew D Redfern,^{7,8} Tom Ferguson,⁷ Daniel A Galvão¹

Program Completion:

36 men with prostate cancer and sclerotic lesions (90%)
32 women with breast cancer and osteolytic lesions (80%).

Metastatic Burden:

Median 5.5 skeletal lesions per patient (range: 1 to 16)
High overall bone metastatic burden (552 lesions in 80 patients).

Skeletal Adverse Events:

No vertebral compressions, change in bone pain, or fragility fractures.

Adverse Events due to Exercise:

No serious adverse events
9 minor adverse events: aggravations of pre-existing conditions only.



- Safe (expected, low grade AE)
- Feasible (~70% attendance)
- Includes people with high-volume metastatic bone disease.
- Includes clinic supervised, and home-based exercises.

- First RCT to test if exercise medicine causes increased survival in patients with mCRPC
- 154 recruited
- 14 trial sites
- 10 countries

MOVEMBER GLOBAL ACTION PLAN 4 - GAP4

Intense exercise for survival among men with metastatic, castrate resistant prostate cancer: (INTERVAL-GAP4).



Exercise medicine for survival

Primary Outcome

- progression free survival

Secondary Outcomes

- overall survival
- time to first symptomatic skeletal-related event
- time to progression of pain, degree of pain
- biomarkers: inflammation, metabolism, androgens
- physical and emotional quality of life

Design

- Supervised exercise versus recommendation + behaviour support
- Moderate to high intensity cardiorespiratory and resistance training
- Autoregulated
- Periodised
- Isometric loading of bone metastatic sites
- Pivoted to telehealth during Covid19 restrictions

Intense Exercise for Survival among Men with Metastatic Castrate-Resistant Prostate Cancer (INTERVAL-GAP4): a multicentre, randomised, controlled phase III study protocol

Robert U Newton,^{1,2,3} Stacey A Kenfield,⁴ Nicolas H Hart,^{1,3,5} June M Chan,^{4,6} Kerry S Courneya,^{1,7} James Catto,⁸ Stephen P Finn,⁹ Rosemary Greenwood,¹⁰ Daniel C Hughes,¹¹ Lorelei Mucci,¹² Stephen R Plymate,¹³ Stephan F E Praet,^{13,14} Emer M Guinan,¹⁵ Erin L Van Blarigan,⁶ Orla Casey,¹⁵ Mark Buzza,¹⁶ Sam Gledhill,¹⁶ Li Zhang,^{6,17} Daniel A Galvão,^{1,3} Charles J Ryan,^{4,17,18} Fred Saad¹⁹

Newton RU, *et al. BMJ Open* 2018;**8**:e022899. doi:10.1136/bmjopen-2018-022899





PIVOTAL EXERCISE TRIAL ADVANCED PROSTATE CANCER

available at www.sciencedirect.com
journal homepage: www.eu-openscience.europanurology.com



Exercise Medicine
Research Institute

Prostate Cancer

Feasibility and Implementation of INTERVAL-GAP4: A Global Randomised Controlled Trial of Intense Hybrid-supervised/Self-managed Versus Self-directed Exercise for Metastatic Prostate Cancer

Adverse Events	Total All Grades	Intervention				Control			
		Grade 1-2	Grade 3	Grade 4	Grade 5	Grade 1-2	Grade 3	Grade 4	Grade 5
Any	271	132	22	1	7	78	24	1	6
Study-related	19	19	0	0	0	0	0	0	0
Serious	34	0	11	1	7	0	8	1	6
Study-related and serious	0	0	0	0	0	0	0	0	0
Exercise-related and led to discontinuation of the	0	0	0	0	0	0	0	0	0
Death related to an AE	13	0	0	0	7	0	0	0	6

232 consented across 14 sites
145 randomised after screening
79 now deceased

Exercise Related

- 49 (all ≤ Grade 3).
- **NONE SRE/SSE.**

SUMMARY

- Safe (expected and low-grade Adverse Events)
- Feasible (median adherence 84%)





ARTICLE OPEN

Clinical Research

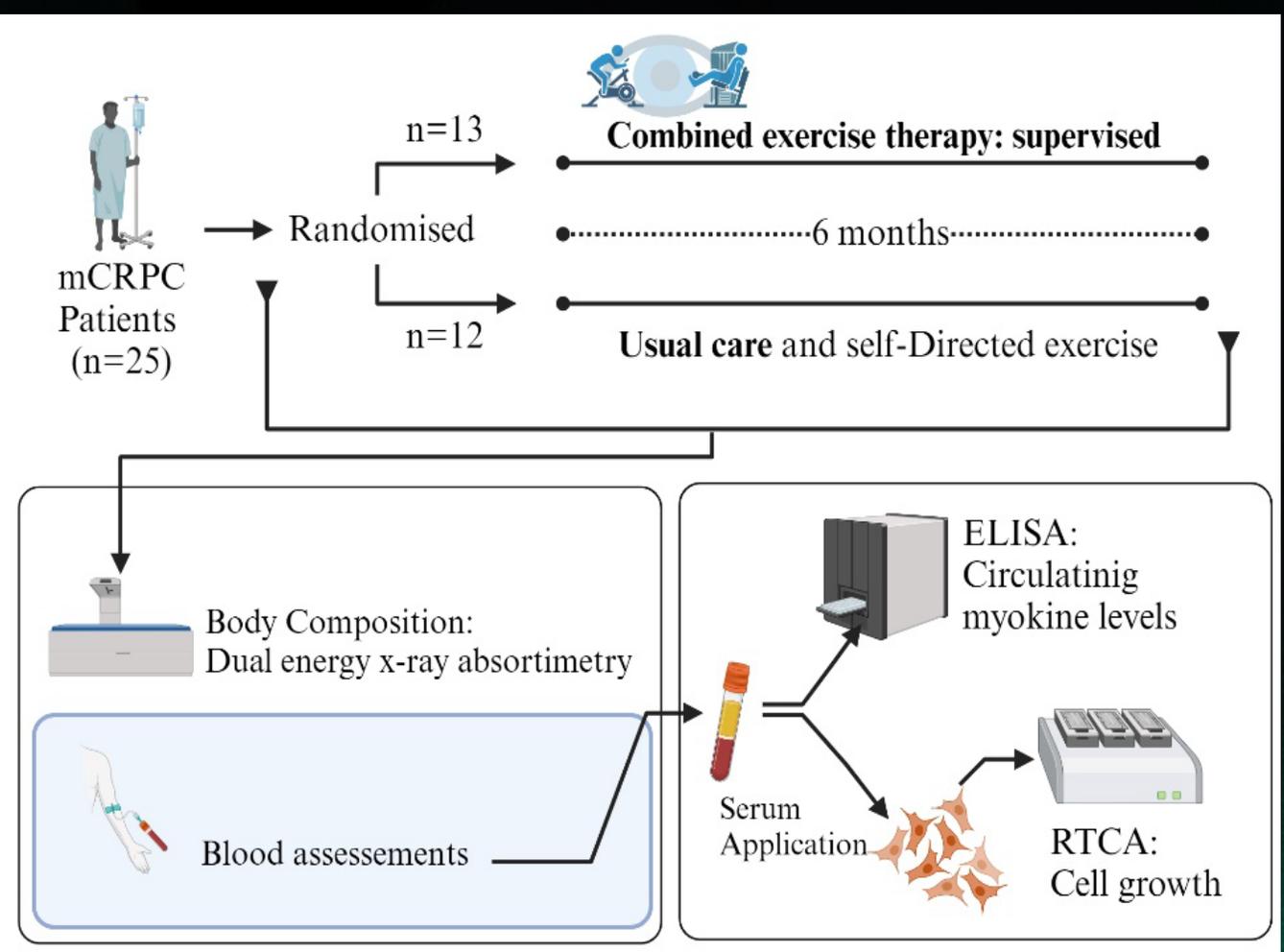
Check for updates

Exercise in advanced prostate cancer elevates myokine levels and suppresses in-vitro cell growth

Jin-Soo Kim^{1,2}, Dennis R. Taaffe^{1,2}, Daniel A. Galvão^{1,2}, Nicolas H. Hart^{1,2,3}, Elin Gray^{2,4}, Charles J. Ryan⁵, Stacey A. Kenfield⁶, Fred Saad^{7,8} and Robert U. Newton^{1,2,8}



Exercise Medicine Research Institute

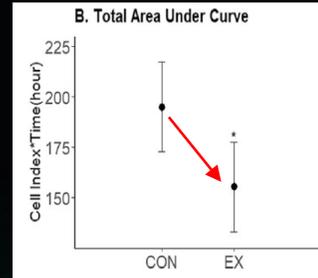
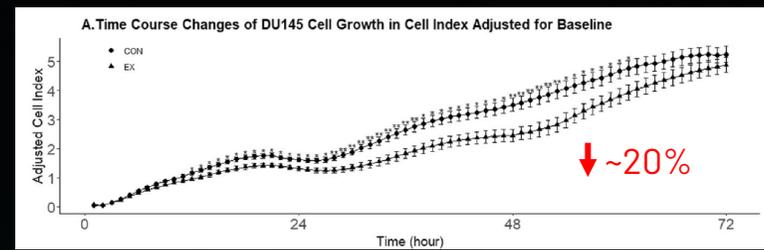


Results

1) Circulating myokine levels

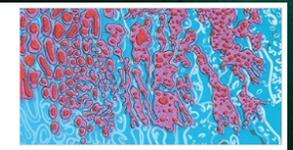
	CON (n = 12)		EX (n = 13)		P-value
	Adjusted mean	95% confidence interval	Adjusted mean	95% confidence interval	
OSM (ng/ml)	4.88	[2.17, 7.59]	8.71	[6.11, 11.30]	0.050
SPARC (pg/ml)	410.58	[362.18, 458.97]	492.66	[446.28, 539.04]	0.022
Decorin (ng/ml)	67.08	[62.92, 71.23]	63.75	[59.76, 67.74]	0.246
Relative OSM (ng/ml/kg)	0.06	[0.03, 0.09]	0.10	[0.07, 0.13]	0.083
Relative SPARC (pg/ml/kg)	4.85	[4.32, 5.37]	5.73	[5.22, 6.23]	0.025
Relative Decorin (ng/ml/kg)	0.78	[0.74, 0.83]	0.77	[0.73, 0.82]	0.770

2) Cell growth



Editors Choice 2022

The Editor of Prostate Cancer and Prostatic Diseases is delighted to share with you this Editor's Choice collection featuring some of the best research and reviews published in the journal in 2022. These papers showcase the breadth of scope and coverage that this journal consistently delivers to its readers.



Collection | 27 Feb 2023

Conclusion

"these data suggest that exercise training promoted systemic adaptations that theoretically could slow PCa progression"



ARTICLE

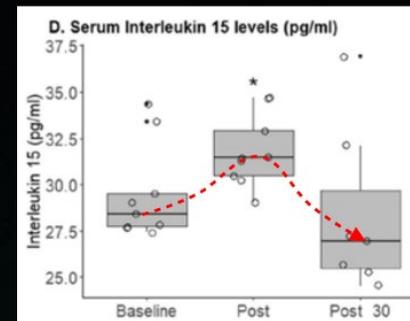
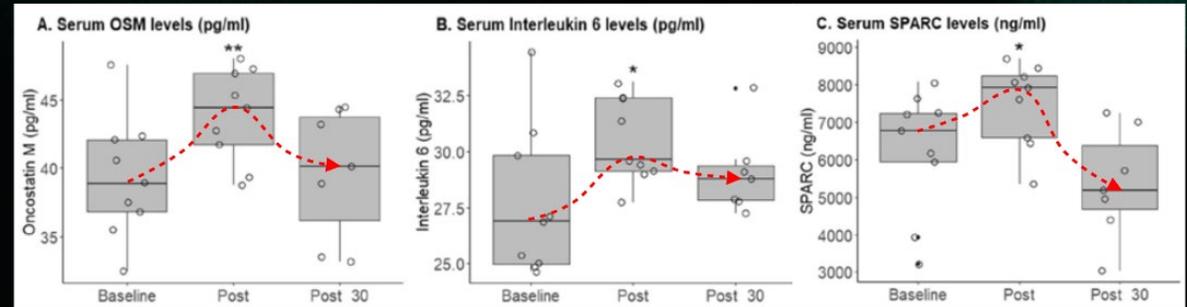
Check for updates

Acute effect of high-intensity interval aerobic exercise on serum myokine levels and resulting tumour-suppressive effect in trained patients with advanced prostate cancer

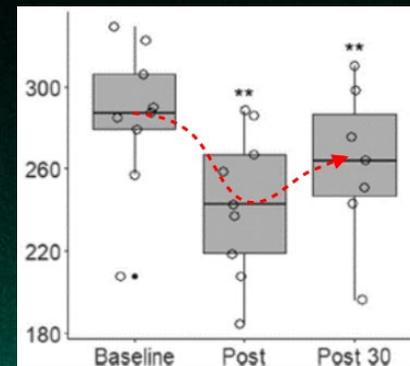
Jin-Soo Kim^{1,2}, Dennis R. Taaffe^{1,2}, Daniel A. Galvão^{1,2}, Timothy D. Clay^{1,2,3}, Andrew D. Redfern^{4,5}, Nicolas H. Hart^{1,2,6}, Elin S. Gray^{2,7}, Charles J. Ryan⁸, Stacey A. Kenfield⁹, Fred Saad¹⁰ and Robert U. Newton^{1,2,11}

Results

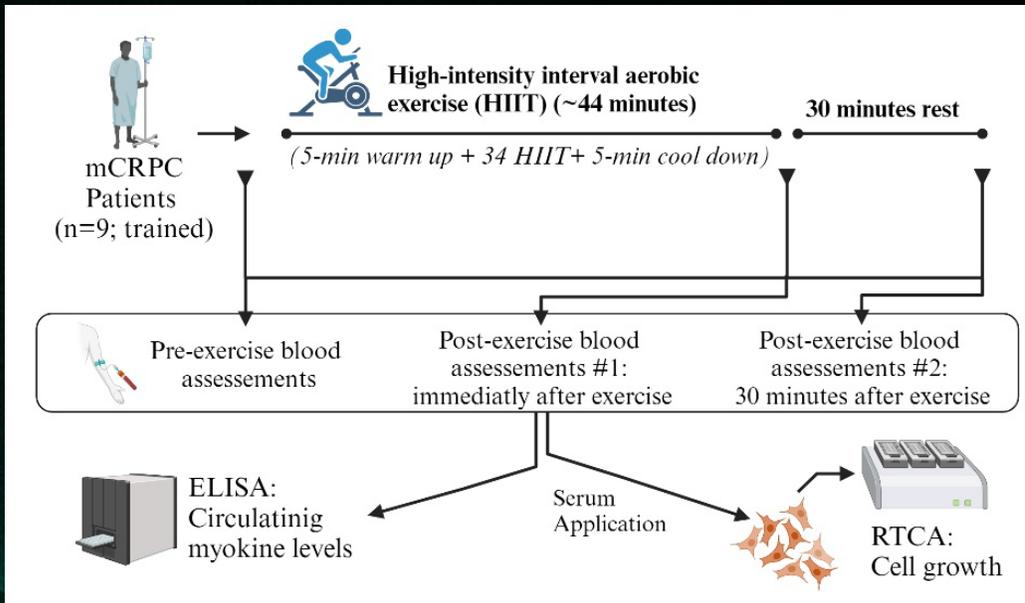
1) Circulating myokine levels



2) Cell growth



Methods



Conclusion

Circulating myokine levels (Oncostatin M, IL-6, SPARC and IL-15) elevate immediately after the exercise and return to baseline after 30 minutes of exercise in trained patients with mCRPC.

Direct application of serum obtained immediately after the exercise reduced prostate cancer cell line (DU145) compared to serum obtained before the exercise.



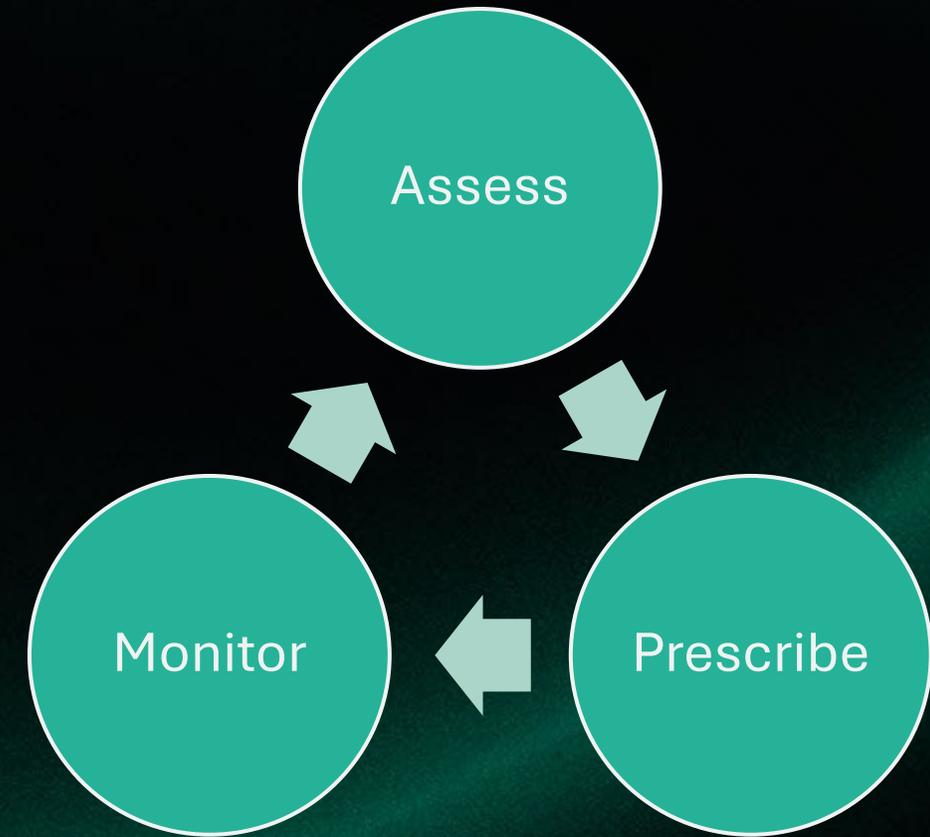
Every bout of exercise might be an additional "dosage" for tumor suppression for an anti-cancer environment established by exercise adaptation via regular exercise.

Precision Exercise Oncology

Precision Exercise Oncology applies extensive biological, health and fitness assessment with integration of wearable sensors to deliver a dynamic, individualized exercise prescription.

Exercise is treated as a first-line therapy—prescription constantly adjusted to optimize cancer suppression, enhance survival, improve the effectiveness of other treatments, and reduce their side effects.

Comprehensive Assessment Model



Body Composition Example

Prostate Cancer - ADT

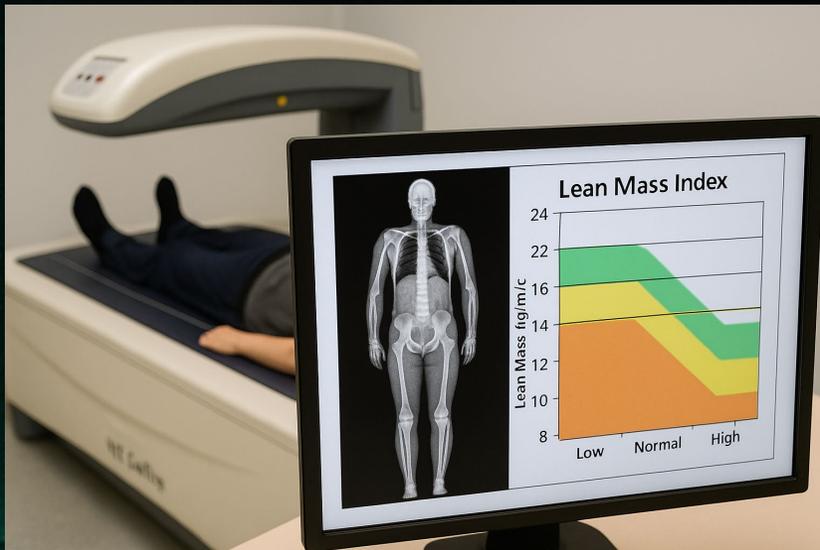
ASSESSMENT

- BMI – overweight
- DEXA – pre-sarcopenic



PRESCRIPTION

- High volume load resistance training
- Large muscle groups
- Compound movements
- Accentuated eccentric
- Periodized
- Protein supplement & energy balance
- Limit aerobic exercise
- Recovery strategies



INTERPRETATION

- Overall & cancer specific mortality risk ↑
- Frailty risk ↑
- Treatment tolerance ↓
- Diabetes and CVD risk ↑

Prioritize Muscle Hypertrophy



Exercise Priming



Realtime monitoring
heart rate, HRV, HRA,
temperature, O2Sat...



Optimize to Individual based
on prior assessments and
response on the day



Enhance tumor perfusion
Reduce hypoxia
Activate immune cells
Exercise-induced hyperthermia



Oxygen enhancement effect
Delivery of radiation sensitizers
Greater immune response
Suppressive tumour microenvironment
Protection of normal tissues

Ubiquitous monitoring: The early warning system

Alterations in physical activity characteristics and sleep quality reflect even the most subtle changes

- Disease progression
- Treatment toxicities accumulating
- Mental health issues





FitMed

Exercise Medicine

Nutrition

Psychology

Patient Education



fitmed.com

actively making you better



PREVENTION

"I want to reduce my risk or stay well long-term."



DIAGNOSIS

"I've have a diagnosis, and want to prepare or stabilise."



TREATMENT

"I'm in treatment and want to stay strong, supported, and reduce side effects."



RECOVERY

"I've completed treatment and want to rebuild or recover."



MAINTENANCE

"I'm doing okay but want to stay that way."



PALLIATIVE

"I want support that respects quality of life, dignity, and control."



Move

Movement is powerful medicine — when it's prescribed. Personalised exercise medicine improves survivability, manages



Nourish

Nutrition is powerful medicine — when it's purposeful. The right foods reduce disease risk, accelerate recovery, and amplify



Restore

Resilience is powerful medicine - when it's supported. Addressing stress, anxiety, and emotional strain improves



Learn

Health literacy is a powerful foundation for personal agency. Learning makes sense of symptoms, treatment, and purpose — clinically

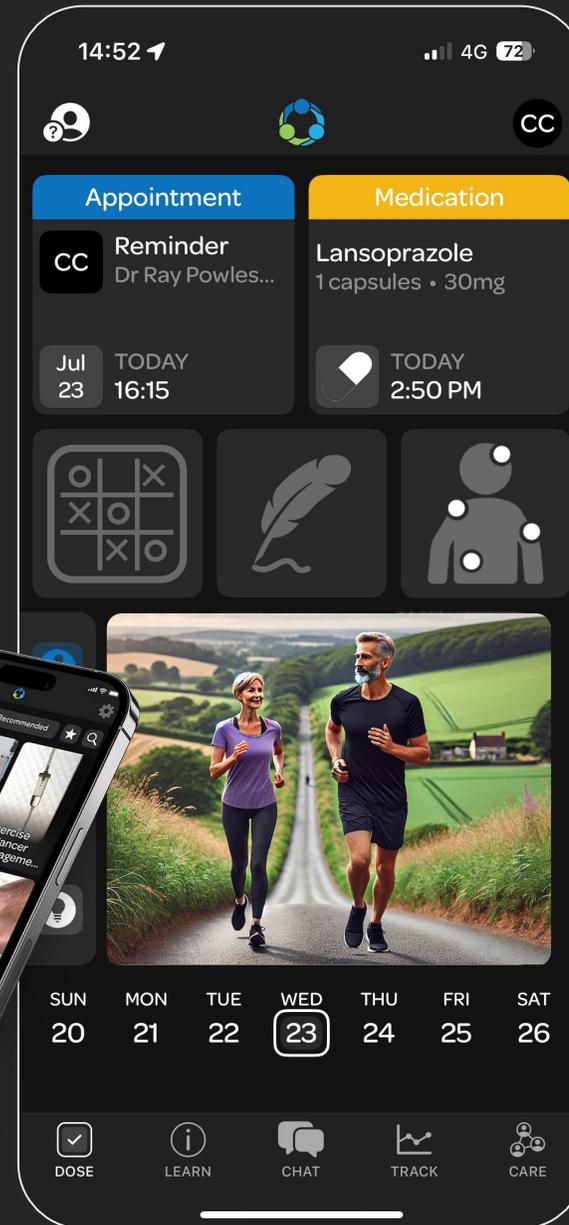


FitMed

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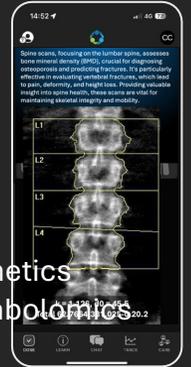


Register



partnerships

- Medical Imaging
- Blood Pathology
- Genomics & Epigenetics
- Microbiome & Metabolomics



- Symptoms
- Disease(s)
- Treatments
- Medication
- Cognitive Function
- Adaptive Pressure
- Behaviour
- Mental State



- Dose Compliance
- SSPP
- Priming Index
- Early Detection
- Pain Score
- Physical Function
- Psychological
- Cognitive
- Cardiopulmonary Function



<https://www.fitmed.com/download>

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DR. ROBERT U. NEWTON

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