Human Cognitive Abilities:
understanding limitations and potential for improvement

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Associate Professor
University of Washington
How to remember new names

- Pay attention to the name when introduced
- Notice a distinct aspect of appearance
- Associate the name with some physical or personality or other trait
- Practice the name after the introduction
- Rehearse information throughout the event
How prevalent is cognitive dysfunction in cancer survivors?

- 1/3 to 2/3 of patients report cognitive dysfunction \((\text{Joly et al., 2010})\)
- May be as high as 70% of survivors \((\text{Boykoff, et al. 2009})\)
- Frustrating
- Upsetting
- frightening
Survivor Perspective

- “you have to fight to make yourself remember numbers, words, places that you go. Sometimes I would leave the house to go somewhere and I really couldn’t remember how to get there... it almost made me break down because of the fact that you think you are losing your mind”

Boykoff et al. 2009)
Impact of Dysfunction

- Diminished independence
- Limited ability to manage responsibilities
- Difficulty or inability to return to work or previous position/level of responsibility
- Early retirement
- Avoidance of social situations or reducing participation in social conversations
- Strain on family, friends

Boykoff et al. 2009)
Responses from Medical Community

- Lack of acknowledgement to denial from medical community of the existence of cognitive dysfunction
- Agreement that cognitive impairment exists but stating that ‘everything will be fine’
- Attributing changes to age, menopause/andropause
- Lack of knowledge on how to manage symptoms

Boykoff et al. 2009)
Pre/Post Chemotherapy Changes in White matter (DTI) in BCa

Deprez et al. 2012

Parietal superior longitudinal fasiculus
Mechanisms of Action

- Neurogenesis - cytostatics inhibit cell division
- Oxidative stress - (carboplatin, cyclophosphamide) and antioxidants block cog. Impairments when co-admin (Konat, 2008)
- 5-FU decreases myelin sheaths (speed of information processing)
- Inflammation – cytokines (MTX activates microglia, but no BZ receptor activity despite cog. Impairment) (Siegers, 2010)
- Blood flow – anti-angiogenic effect of cytostatic agents
Duration?

- Most studies assessed cognitive function post chemotherapy.
- Some studies indicate continued cognitive impairments 5–10 years post chemotherapy (e.g. forgetfulness, increased distractibility, problems concentrating) (Ganz et al, 2002; Ahles et al., 2002).
- Other studies indicate that cognitive impairments noted 2 years post treatment were no longer present 4 years post-treatment (Schagen et al, 2002).
Cognitive Impairment in Breast Cancer

Original Article

**Figure 3.** The frequency of acute treatment-related changes in cognitive function based on the practice effect adjusted reliable change index is depicted.

**Figure 4.** The frequency of late emerging changes in cognitive function based on the practice effect adjusted reliable change index is depicted.
Variables to be considered

Chemotherapy
- Intelligence
- Education
- Genetics
- Menopause

Hormonal Therapy
- Anxiety
- Depression
- Fatigue

Cognitive Impairment
- Attention span
- Concentration
- Memory
- Organizational ability
- Arithmetic skills
- Language skills

Neural integrity

Diminished Quality of Life
- Activities of daily living
- Interpersonal relationships
- Work/profession
- Future Education

Olin, JJ, 2001
Intermittent Androgen Suppression (IAS)

Combined treatment:
- LHRH (GnRH) agonist – leuprolide acetate 7.5 mg IM injection every 4 weeks
  - Inhibits LH/FSH secretion from the pituitary
- Flutamide 250mg p.o. three times daily
  - Androgen receptor antagonist – competes w/ T/DHT for AR
- IAS cycles androgen withdrawal (6-9 months) with an “off treatment” period
- Treatment is reinstated as the prostate specific antigen (PSA) reaches a threshold
Long term consequences of androgen suppression include:

- Decreased libido, Obesity, Anemia, Osteoporosis, Muscle atrophy, Gynecomastia, diabetes (insulin resistance), heart disease, Mood changes

Higano et al. (1999) found significant loss in bone mineral density within 9 months and sometimes as early as 3 months.
Androgen Receptors - Rat

from R.E. Brown 1994
Testosterone maintains synapses in hippocampus

Leranth et al., *J. Neurosci*. 2003
Mental Rotation

(Cherrier et al., 2009)

* * p < .05
Self Ordered Pointing Task

Total Errors

Baseline | On Treatment | Off Treatment

IAS | Control

(Cherrier et al., 2009)
Androgen Deprivation Therapy and Future Alzheimer’s Disease Risk

Kevin T. Nead, Greg Gaskin, Cariad Chester, Samuel Swisher-McClure, Joel T. Dudley, Nicholas J. Leeper, and Nigam H. Shah

See accompanying editorial on page 530

ABSTRACT

Purpose
To test the association of androgen deprivation therapy (ADT) in the treatment of prostate cancer with subsequent Alzheimer’s disease risk.

Methods
We used a previously validated and implemented text-processing pipeline to analyze electronic medical record data in a retrospective cohort of patients at Stanford University and Mt. Sinai hospitals. Specifically, we extracted International Classification of Diseases-9th revision diagnosis and Current
Variables to be considered

- Chemotherapy
  - Intelligence
  - Education
  - Genetics
  - Menopause
- Hormonal Therapy
  - Anxiety
  - Depression
  - Fatigue

Cognitive Impairment
- Attention span
- Concentration
- Memory
- Organizational ability
- Arithmetic skills
- Language skills

Age

Neural integrity

Diminished Quality of Life
- Activities of daily living
- Interpersonal relationships
- Work/profession
- Future Education

Olin, JJ, 2001
Ahles et al. (unpublished) interactions between elevations in cytokines and genetic polymorphisms

Stress- Ganz et al. (unpublished) interaction between memory impairments and Trier stress test

Collins et al (unpublished) breast cancer decliner(s) from chemo. were more likely to be depressed and/or on dep. Meds

Treatment expectancies
Anxiety & Depression

- Depression incidence in cancer patients (6% to 50%)
  - Depression rates generally improve (i.e. decrease) following treatment
  - Only patients with ongoing symptoms demonstrate high levels of depression
- Studies do not find an association between objective cognitive performance and depression/anxiety
- Studies do find an association between subjective perception of cognitive impairment and depression/anxiety
Pharmacological interventions

- Psychotropic medications
  - Depression
  - Avoid anti-anxiety medication (Benzodiazepines)
- Cognitive Enhancers
  - Cholinesterase inhibitors & AD medications - modest improvement in breast CA (Lawrence et al., 2015)
  - Gingko
- Statins & anti-inflammatory
- Stimulants- ADHD
  - Methylphenidate study neg. for BC (lower et al., 2009)
- Modafinil- mixed results
Other interventions

- Exercise
  - Exercise improves cognition in older adults and those with mild memory impairments (Baker et al., 2010, Liu-Ambrose, 2010; Davis, 2010)
  - Exercise may improve fatigue, pain, and overall health and quality of life in cancer survivors and those undergoing treatment (McTiernan, 2004; Denmark-Wahnefried et al, 2003)
  - Increases regional capillary density, neural metabolic capacity, BDNF, neurogenesis
Good Brain Health

- **Sleep**
  - A good nights sleep – better than extra study time
  - Glymphatic system to clear toxins

- **Prevention – Optimization**
  - Diet- mediteraneaean
  - Alcohol within health guidelines

- **Use it or lose it-**
  - New learning, games, social activities
Sternberg: Working Memory Task. Increased performance is evident for the TX group post-intervention during a cognitive load of 7 compared to pre-intervention (Cherrier, Gray, Higano, 2018)
Memory Systems and Processes

- Sensory Store
- Working Memory
- Long-Term Memory

- Working Memory: storage, processing
- Long-Term Memory: episodic, semantic

- Encoding
- Retrieval

- Lost
- Lost?

- Lost
Forgot my password.......
Memory Systems and Processes

- Sensory Store
- Working Memory
- Long-Term Memory

- Storage
- Processing
- Episodic
- Semantic
Types of Memory

- Photographic “eidetic” memory
  - Memory is reconstructive
- Procedural Memory
  - How to drive a car/ride a bike, Phone numbers, Navigate to a well known place
- Semantic
  - Knowledge, facts, vocabulary
- Episodic
  - Tied to time and place, what you ate for breakfast
Cognition/Memory/Processes

- Eye-witness testimony
  - Memory can be influenced, and distorted
  - Some people are highly suggestable
  - Schemas
  - Salient
- Flashbulb memory
- Rashomon effect
  - Shy, victim vs perpetrator
- Interference effects
Interference Effects

- Ship, outer, crawl (space)
- Ship (ocean), outer (inner), crawl (floor)
Motivation to remember grocery list = low
You Live Here 2 miles and 3,000 feet from the Nearest Grocery store
Performance curve

Low
Medium
High

Performance

Low
Medium
High

Arousal Level

(anxiety)
How to Improve your memory

- Targeted approach (symptoms & interactions)
- Remember location of keys
  - Develop a new habit
- Remember a list of words
  - Method of loci/ Imagry
  - Make the information meaningful
  - Organize the information
  - Rehearse the information
  - SQ3R method
“I kept forgetting our anniversary, but now I just pretend it’s a baseball stat.”
Learning new memory techniques

- Have realistic goals & expectations
- Take time to reflect and examine your performance & commitment
- Reward yourself for achievements
- Confer with others on how they go about remembering or learning new information
How to Maintain Good Brain health

- Avoid T.V. or other passive types of
- New learning - **Make it Challenging**
  - New language, dance, routine or habit, app
  - How do you know if it is challenging? You are likely to be frustrated, stymied, feel bad at some point
- These activities build ‘fluid’ intelligence

Comfort is detrimental to the brain
Good General Health = Brain Health

- Address any health/disease conditions (e.g. hypertension, hyperlipidemia, depression)
- Exercise Regularly
- Alcohol in Moderation
- Get enough sleep
- Manage stress
- May consider taking Vitamins
Bronka Sundstrom

Age 77
Oldest woman to summit Mt. Rainier, Sept., 2002.
Time: 19 hours Round Trip

Average Time:
30-35 hours

Oldest Man: age 81, 3 days
Resources:

- Welcome to Your Brain: Why You Lose Your Car Keys but Never Forget How to Drive and Other Puzzles of Everyday Life (Aamodt & Wang, 2008)
- Achieving Optimal Memory (Nelson, 2005)
- Productivity podcasts: GTD, prodpod, beyond the to-do-list, productivityist
- cherrier@uw.edu
Acknowledgements

S. Minoshima
D. Cross
C. Higano
M. Johnson
P. Borghesani
C. Moinpour
B. Kurland

Funded in part by NIA AG00858, NCI CA120933
AFAR, M01-RR-00037, DOD-CDMRC-DAMD 17-03-1-0045,
VA Puget Sound Health Care System
Exercise, Diet and Prostate Cancer

Kerri Winters-Stone, PhD, FACSM
Knight Cancer Institute & School of Nursing
Oregon Health & Science University
Outline

• Role of exercise in prostate cancer management
  – Acute and chronic treatment related toxicities
  – Disease control
  – Exercise guidelines to date

• Role of diet in prostate cancer management
  – Disease control
  – Exercise nutrition

• Making changes in behavior
  – Barriers and facilitators of success
  – Current opportunities
Prostate Cancer Survivorship

• Side Effect / Symptom Management
  – Fatigue
  – Weakness
  – Unhealthy body composition
• Psychosocial Impact (QOL)
• Long-Term / Late Effects
  – Cardiometabolic: Diabetes & CVD
  – Musculoskeletal: Physical frailty & falls
• Disease Control
Exercise and Nutrition to Optimize Health

Diet + Exercise

Cancer & Treatment
- Surgery
- Radiation
- Chemotherapy
- Hormone Manipulation Therapy

Aging

Physiologic decline
- Fatigue
- Weakness
- Inactivity
- Poor mobility
- Cardiomyopathy
- Bone loss
- Fat gain

Decreased Physical Activity

FRAILTY

HEART DISEASE

FRACTURES

OBESITY

SURVIVAL

Winters-Stone et al, Oncol Nurs For 35(5); 2008
Winters-Stone et al, Oncol Nurs For 36(3); 2009
Winters-Stone et al, Arch Phys Med Rehab 92(4); 2011
Nutrition and Exercise Medicine
Random Facts

If walking is good for your health, the postman would be immortal.

A whale swims all day, only eats fish, only drinks water and is fat.

A rabbit only eats vegetables, runs and hops all day long and only lives 5 years.

A tortoise doesn't run and does nothing energetic, yet it lives for 450 years.

And you tell me to exercise!
Exercising *may* slow prostate cancer progression

![Graph showing reduction in risk for exercising > 3 hrs/week compared to < 1 hr](image)

Kenfield J Clin Oncol 29(6), 2011; Richman Cancer Res 71(11), 2011.

Reduction in risk for exercising > 3 hrs/week compared to < 1 hr

-50\% -40\% -30\% -20\% -10\% 0\% -10\% Prostate cancer deaths All-cause mortality Disease recurrence
Post-diagnosis total physical activity in relation to:
(A) all-cause mortality and
(B) prostate cancer–specific death
How much physical activity works?

Figure 1a. Vigorous activity after diagnosis and risk of prostate cancer recurrence and mortality in two cohorts.

Figure 1b. Walking pace and duration of walking after diagnosis and risk of prostate cancer recurrence and mortality in two cohorts.
Exercise medicine for advanced prostate cancer
Resistance Exercise Reduces Body Fat and Insulin During Androgen-Deprivation Therapy for Prostate Cancer

Kerri M. Winters-Stone, PhD, Nathan Dieckmann, PhD, Gianni F. Maddalozzo, PhD, Jill A. Bennett, PhD, RN, Christopher W. Ryan, MD, and Tomasz M. Beer, MD

Oncol Nurs For 42(4):348-356, 2015

Androgen-deprivation therapy → Increase in adiposity → Inflammation → Cancer progression

Insulin resistance

Figure 1. Model of Androgen-Deprivation Therapy Influence on Body Composition and Biomarkers Associated With Cancer Progression

Resistance Training

↓ Total Fat
↓ Trunk Fat
↓ Insulin

Test for mediation p<0.05
Exercise can counter treatment side effects

<table>
<thead>
<tr>
<th>Problem</th>
<th>Clinical Management</th>
<th>Exercise Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue</td>
<td>Medication management</td>
<td>✓</td>
</tr>
<tr>
<td>Weakness</td>
<td>None</td>
<td>✓</td>
</tr>
<tr>
<td>Muscle loss</td>
<td>None</td>
<td>✓</td>
</tr>
<tr>
<td>Bone loss</td>
<td>Medication management</td>
<td>✓/?</td>
</tr>
<tr>
<td>Fat gain</td>
<td>None</td>
<td>✓</td>
</tr>
<tr>
<td>Depression, Anxiety, Distress</td>
<td>Medication management, Support group</td>
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</tr>
<tr>
<td>Diabetes</td>
<td>Medication management</td>
<td>✓</td>
</tr>
<tr>
<td>CVD</td>
<td>Medication management</td>
<td>✓</td>
</tr>
<tr>
<td>Frailty / Disability</td>
<td>None</td>
<td>✓</td>
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<tr>
<td>Falls</td>
<td>None</td>
<td>✓/?</td>
</tr>
<tr>
<td>Disease Control</td>
<td>Medication management</td>
<td>✓/?</td>
</tr>
</tbody>
</table>
Exercise and Fatigue Management

Significant reduction in fatigue and increase in QOL across types of training

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Exercise</th>
<th>Control</th>
<th>Std. Mean Difference IV, Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bourke et al</td>
<td>-48.4 4 25</td>
<td>-42.8 8 25</td>
<td>-0.93 [-1.52, -0.35]</td>
</tr>
<tr>
<td>Bourke et al</td>
<td>-48.8 8.2 43</td>
<td>-42.4 8.6 43</td>
<td>-0.40 [-0.82, 0.03]</td>
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<tr>
<td>Bussart et al</td>
<td>18.5 13.9 29</td>
<td>30.6 17.6 28</td>
<td>-1.00 [-1.55, -0.46]</td>
</tr>
<tr>
<td>Cormie et al</td>
<td>-43.8 6.8 32</td>
<td>-41.4 9.5 31</td>
<td>-0.28 [-0.76, 0.21]</td>
</tr>
<tr>
<td>Culos-Reed et al</td>
<td>4.15 1.56 53</td>
<td>4.46 1.12 47</td>
<td>0.22 [0.62, 0.17]</td>
</tr>
<tr>
<td>O'Neill et al</td>
<td>29.4 15.5 47</td>
<td>34.1 19 47</td>
<td>-0.27 [0.68, 0.14]</td>
</tr>
<tr>
<td>Segal et al</td>
<td>-41.8 10.5 82</td>
<td>-40.3 9.4 73</td>
<td>-0.13 [0.45, 0.19]</td>
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<tr>
<td>Segal et al</td>
<td>-44.2 8.9 40</td>
<td>-42.1 9.8 41</td>
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<td>Segal et al &amp; a</td>
<td>-45.1 8.1 40</td>
<td>-42.1 8.6 41</td>
<td>-0.33 [0.77, 0.11]</td>
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<td>Nisen et al</td>
<td>35.7 16.1 28</td>
<td>33.2 23.3 27</td>
<td>0.04 [-0.46, 0.55]</td>
</tr>
</tbody>
</table>

Total (95% CI) 419 406 100.0% -0.32 [-0.45, -0.19]

Favours [exercise group] Favours [control group]

-↓ Fatigue

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
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<th>Control</th>
<th>Std. Mean Difference IV, Fixed, 95% CI</th>
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</thead>
<tbody>
<tr>
<td>Bourke et al</td>
<td>128.4 14 25</td>
<td>121.1 25 25</td>
<td>0.34 [-0.22, 0.90]</td>
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<tr>
<td>Bourke et al</td>
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<td>117.8 21.2 43</td>
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<tr>
<td>Bussart et al</td>
<td>49.2 7.9 29</td>
<td>44.8 9.5 28</td>
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</tr>
<tr>
<td>Cormie et al</td>
<td>51.5 8.3 32</td>
<td>53.1 6.6 31</td>
<td>-0.21 [-0.71, 0.29]</td>
</tr>
<tr>
<td>Culos-Reed et al</td>
<td>73.12 15.96 53</td>
<td>69 15.12 47</td>
<td>0.26 [0.13, 0.86]</td>
</tr>
<tr>
<td>Galvão et al</td>
<td>49.2 7.9 28</td>
<td>44.8 9.5 28</td>
<td>0.50 [-0.03, 1.03]</td>
</tr>
<tr>
<td>O'Neill et al</td>
<td>118.4 21.1 47</td>
<td>117.5 22.6 47</td>
<td>0.02 [-0.38, 0.43]</td>
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<tr>
<td>Segal et al</td>
<td>120.2 15.6 92</td>
<td>117.6 14.9 73</td>
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<td>Segal et al</td>
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<td>89.8 13.1 41</td>
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<td>Segal et al &amp; a</td>
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<td>80.0 13.1 41</td>
<td>0.19 [0.24, 0.63]</td>
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<tr>
<td>Nisen et al</td>
<td>79.6 17 28</td>
<td>78.9 20.7 27</td>
<td>0.04 [-0.48, 0.55]</td>
</tr>
</tbody>
</table>

Total (95% CI) 448 434 100.0% 0.21 [0.08, 0.34]

Favours [control group] Favours [exercise group]

-↑ QOL
Hart, Nicolas H.; Galvão, Daniel A.; Newton, Robert U.
Exercise Guidelines for Cancer

- Follow U.S. DHHS physical activity guidelines
  - As physically active as abilities allow
  - Avoid inactivity
  - Some activity is better than none
- Cancer: Continue normal activities as much as possible during and after non-surgical treatments
- Benefit > Risk
At least 30 minutes of moderate-intensity aerobic activity per week for a total of 150 minutes

OR

At least 25 minutes of vigorous aerobic activity per week for a total of 75 minutes

or a combination of the two

AND

At least 2 days per week of muscle-strengthening activity

for additional health benefits
How Much?

U.S. PUBLIC HEALTH GUIDELINES

Sedentary
- Symptoms
- Preserve mobility
- Better sleep
- Mortality?

Light Activity
- Response
- Fitness
- Metabolic Health
- Weight loss
- Bone health
- All-cause mortality

Moderate Activity
- Response
- Cancer recurrence

Heavy Activity
What type?

| AEROBIC | • Symptom management, cardiometabolic health, weight control, mobility  
|         | • 3-5 days per week @ mod-vig intensity |

| RESISTANCE | • Symptom management, musculoskeletal health, weight control, mobility  
|            | • Whole body, low-vigorous intensity, 2-3 d/wk |

| FLEXIBILITY | • Mobility, Improved mood, Better sleep  
|             | • Daily for 15-20 minutes |

Combined programs (aerobic + resistance) may optimize benefits; Ideal dose is unknown but benefits can occur with a minimum of 3 days of exercise
Safety

- Exercise generally safe; symptom limited effort (autoregulation)
- No consistent increase in PSA or Testosterone following aerobic or resistance training
- With appropriate modification and supervision, exercise also safe for men with bone metastases

Table 1. Modular multimodal exercise programme for patients with bone metastases

<table>
<thead>
<tr>
<th>Metastases site</th>
<th>Upper</th>
<th>Trunk</th>
<th>Lower</th>
<th>Aerobic</th>
<th>Flexibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelvis</td>
<td>√</td>
<td>√</td>
<td>√**</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Lumbar spine</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√***</td>
</tr>
<tr>
<td>Thoracic spine/ribs</td>
<td>√*</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√***</td>
</tr>
<tr>
<td>Proximal femur</td>
<td>√</td>
<td>√</td>
<td>√**</td>
<td>√</td>
<td>√***</td>
</tr>
<tr>
<td>All regions</td>
<td>√*</td>
<td>√</td>
<td>√**</td>
<td>√</td>
<td>√***</td>
</tr>
</tbody>
</table>

√, target exercise region; *, exclusion of shoulder flexion/extension/abduction/adduction – inclusion of elbow flexion/extension; ***, exclusion of shoulder flexion/extension/abduction/adduction – inclusion of knee flexion/extension/rotation; √, exclusion of hip extension/flexion – inclusion of knee extension/rotation; √***, exclusion of spine/flexion/extension/rotation; NWB, nonweight bearing (e.g. cycling); WB, weight bearing (e.g. walking). Reproduced from [102].
Exercise Nutrition

Aerobic Exercise

- Need energy to support metabolic demands of exercise
- Pre-exercise
  - Light carb-based meal (100-200 kcals) 30-60 minutes prior
  - Black coffee
  - Avoid protein and fat
- Post-exercise
  - Carb-based meal within an hour of exercise replaces lost muscle stores of energy

Resistance Exercise

- Need sufficient protein for building blocks for muscle and bone
- Aim for average protein intake of >1.0g/kg body weight per day
- Older adults and/or very active may need more (1.2-1.5 g/kg)
  - Beans/legumes, eggs, salmon, Greek yogurt
- Post-exercise
  - 10-20 g of PRO within an hour of exercise can enhance muscle gains

ALWAYS ENSURE ADEQUATE HYDRATION BEFORE, DURING AND AFTER EXERCISE
# Diet and Prostate Cancer Progression

<table>
<thead>
<tr>
<th>Increased risk</th>
<th>Decreased risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>• BMI****</td>
<td>• Fish**</td>
</tr>
<tr>
<td>• Dairy/calcium**</td>
<td>• Tomatoes/lycopene**</td>
</tr>
<tr>
<td>• Processed red meat</td>
<td>• Vegetable fat**</td>
</tr>
<tr>
<td>• Eggs/choline</td>
<td>• Cruciferous vegetables**</td>
</tr>
<tr>
<td>• Poultry (w/skin)</td>
<td>• Coffee</td>
</tr>
<tr>
<td>• Animal fat/saturated fat</td>
<td>• Soy</td>
</tr>
<tr>
<td>• Selenium supplementation</td>
<td>• Tea</td>
</tr>
</tbody>
</table>

↑ number of asterisks = ↑ strength of evidence

Diet Recommendations

**FOODS TO INCLUDE**

- **Healthy Fats** from oils: 1+ Tbs/day
  - Oils from nuts, olives, avocado
- **Nuts**: > ¼c. or 2 Tbs/day
  - Tree nuts, peanuts, nut butters
- **Cruciferous veggies**: > ½ c/day
  - Broccoli, kale, cabbage, cauliflower, brussels, mustard greens
- **Cooked tomatoes**: > ½ c, 2x/week
  - Stewed tomatoes, tomato paste (2 Tbs)/sauce
- **Fish (high omega-3)**: 3-5 oz 2x/week
  - Salmon, tuna, black cod, anchovies

**FOODS TO AVOID**

- **Processed meat**
  - Bacon, sausage, lunch meat
- **Poultry with skin**
  - Turkey, chicken
- **Whole milk**
  - Low fat OK
- **Dietary supplements**
  - Unless prescribed by your doctor
  - Multivitamin OK
EXERCISE
Some motivation required.
**Go Play!**

- **FC Prostate**: 32 week exercise study for prostate cancer survivors (n=57)
- Football program, progressed from 1 to 2 hours of game play per week
- Improved strength, function and bone health
- Good long term retention and adherence, but a few injuries
Find a Group

- Group based training > adherence and outcomes than home-based training
- Group camaraderie
- Better adherence to training / motivation
- Ability to modify programs

*A few Pacific Northwest programs*
- Livestrong at the YMCA ([https://www.livestrong.org/ymca-search](https://www.livestrong.org/ymca-search)): 206-344-3181
- Butts in a Boat ([richard.wassersug@ubc.ca](mailto:richard.wassersug@ubc.ca))
- FIT Together (PDX) [fittogethertraining.org](http://fittogethertraining.org)
But, home can work too

Exercise instructed @ 3 levels of intensity

Wearables can motivate!

Fatigue Changes Over 8 Weeks

Baseline | 4 weeks | 8 weeks
---|---|---
Recommendation | DVD

* p<0.05

Winters-Stone et al J Supp Care Cancer 26; 2018
Diet Resources

• Movember Community of Wellness TrueNTH
  – https://us.truenth.org/exercise-and-diet/diet

• Prostate Cancer Foundation
  – https://www.pcf.org/c/five-foods-to-protect-your-prostate/

• American Institute for Cancer Research
  – http://www.aicr.org/healthyrecipes/

• National Cancer Institute
Grab Your Partner

- Health in couples is reciprocal
  - Behavior change is more successful when both partners are engaged

- EXERCISING TOGETHER®
  - Partner based exercise program for couples coping with prostate cancer
  - 100% retention and improved health of each partner and their relationship

- New trial starting in 2019

EXERCISING TOGETHER
• NIH funded exercise trial to test benefits of partnered exercise
• Recruitment starts November 2018
• Couples coping with prostate, breast or colon cancer
  – Within 2 years of treatment
  – Ages 40-75
  – Able to attend on-site exercise classes for 6 months

GET FIT Prostate
• NIH funded exercise trial to test fall prevention exercise programs
• Recruitment starts December 2018
• Prostate cancer survivors on ADT currently or in the past
  – No age limit
  – Able to attend on-site exercise classes for 6 months

Email: exercise@ohsu.edu for more information
Commit to 1 change today

Stand more, sit less
Go a little further
Work a little harder
Try something new

Add something + to your diet
Remove something – from your diet
Leave something on your plate
YOU CAN'T GO BACK & MAKE A BRAND NEW START
BUT YOU CAN START NOW & MAKE A BRAND NEW ENDING

THANK YOU