

Integration of exercise sciences research: Achieving a balance between reductionist versus integrative approaches

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The theme of this talk will be that exercise sciences will badly miss achieving a balance between reductionistic versus integrative approaches under the current NIH plan to reorganize NIH study sections

- NIH has proposed to deemphasize exercise sciences in their reorganization of study sections

NIH wants to score exercise grants in multiple study sections whose mentality does not appreciate the balance between reductionism and integration in exercise to score exercise grants against grants better appreciated by the group dynamics of that study section

One site of the NIH show stopper is the Center for Scientific Review (CSR), which provides staff support to the Office of the NIH Director in the **formulation of grant application review policies** and procedures.

Dr. Ellie Ehrenfeld is director of the Center for Scientific Review at NIH.

One of Dr. Ehrenfeld's often quoted reasons for altering study section structures is:

“Applications describing some of the most productive, **highest impact work may be assigned to too few study sections, causing too much of the ‘best science’ to compete with itself; that the scope of some study sections is restricted to research with relatively **low impact**, resulting in **undeserved ‘entitlements’”****

In the next few slides the validity of the charge that exercise is

■ Low impact and an

■ undeserved 'entitlement'
will be discussed

Is exercise a “Low impact science”?

- **Physical inactivity which causes**
 - **250,000 deaths per year in USA**
 - 12% of all deaths and 1/4 of preventable deaths
 - **\$300,000,000,000 in unnecessary health care costs per year**
 - 1/4 of all health care costs
 - Equivalent of 25 NIH's

Is exercise a “Low impact science”?

- 6-fold increase in diabetes from 1958-1993
 - Onset of adult disease in children
- 2-fold increase in obesity since 1980
 - Including 2-fold increase in children
 - Predicted that 75% of Americans will be overweight and 33% will be obese in 2025
- 700,000 deaths from diseases of heart each year

Common denominator is that these are metabolic dysfunctions from physical inactivity

Death cost:

250,000 early deaths each year due to physical inactivity in USA

- Estimated from multiplying 1/3 times the number of deaths from coronary artery disease and atherosclerosis, diabetes, and colon cancer in the USA.
- 1/3 is the number of preventable deaths from abolishing sedentary living (Powell & Blair, *MSSE* 26:851, 1994).

SeDS

is

Sedentary

Death

Syndrome

Is exercise a “Low” impact science

- **SeDS (Sedentary Death Syndrome)**
 - 250,000 deaths/yr US
 - Deaths rising
 - Zero study sections and no IRG

What is the public's response to 100 deaths from Firestone tires?

■ High impact:

- Continuous media coverage
- Congressional hearings
- Calls for prevention
- Public fear to get right tires
- Lawsuits

Imagine the public's response if flu killed 250,000 one year?

High impact

- public fear,**
- political action, and**
- immediate funding to prevent this epidemic again**

What is the response to the 250,000 SeDS (sedentary environmental death syndrome) deaths in America each year?

- **No public fear and panic**
- **No media coverage**
- **No Congressional hearings**
- **No bills to increase funding**
- **No NIH plan**
- **No study section for this health issue**
- **Indeed, NIH implies this is low impact science with an undeserved “entitlement”**

NIH: “Undeserved entitlement”:

- **Prolonged bed rest after heart attacks increases health risks**
- **Exercise could prevent 1/3 of the deaths for heart disease, type 2 diabetes, and colon cancers**
- **Exercise does not use the proximal insulin signaling pathway but instead uses AMP kinase to signal increased muscle glucose uptake**
- **Type 2 muscle fibers predispose to insulin resistance.**

Is NIH money for research so tight that the reorganization of study sections must be based upon money decisions?

- **NIH budget is doubling**
- **Congress is questioning whether NIH can spend all its new monies in a wise manner**
- **“Congress poised for big increase in U.S. spending”** *New York Times* Sept 10, 2000, p. 1

**Next let us compare written NIH
reports to actions**

Recommendations for change at the NIH's Center for Scientific Review (CSR)

“The purpose of this evaluation is to position the CSR peer system to foster the expanded research opportunities created by the stunning successes of the biomedical research enterprise, as well as to **permit the review system to keep pace with the accelerating rate of change** in the way biomedical research is now performed.”

“Diabetes rate soars for Americans in their 30’s

**Weight gain, lack of exercise bring
on disease faster”**

**“We’re seeing the greatest increase in obesity and
lack of physical activity in that age group. It used to
be the average onset of Type 2 diabetes was age 50.
Now we’re seeing it in the 40s and also beginning to
see Type 2 diabetes in the teenage years.”**

(Frank Vinicor of the CDC)

USA Today August 2000

SeDS (Physical Inactivity):

■ Increases incidence

Arthritis pain
Allergies
Arrhythmias
Asthma
Breast cancer
Colon cancer
Congestive heart failure
Depression
Digestive problems
Fibromyalgia
Gallstone disease
Headaches
High blood triglyceride
High blood cholesterol
Hypertension
Irritable bowel syndrome
Low blood HDL
Menopausal symptoms
Myocardial ischemia

Neck pain
Obesity
Osteoporosis
Physical frailty
Respiratory problems
Sleep apnea

Type 2 diabetes

■ Increases the progression of 8 disabilities

Chemotherapy
Chronic back pain
Debilitating illnesses
Disease cachexia
Falls resulting in broken hips
Physical frailty
Spinal cord injury
Stroke
Vertebral/femoral fractures

Four principles: Home for all review of all science that is relevant to contemporary biomedical research

“Indeed, several appreciative ‘home**S**’ for contemporary and newly emerging research directed to primary prevention of chronic diseases are available in the proposed set of IRGs.” Dr. Ehrenfeld’s letter of 19 April in response to petition from 100 scientists for **one home** (study section) to prevent 250,000 deaths per year.

We need to ensure at least **one home** for SEDS.

Principle 2: Topics should be sufficiently cohesive to allow the external advisory group of scientists to judge the entire scope of the science.

- The **entire scope** of SeDS covers almost every organ system, tissue, NIH study section, and NIH Institute
- Several “homes” will not provide a sufficiently cohesive study section to judge the entire scope of 250,000 SeDS deaths/yr.
- We need to ensure at least one **cohesive** study section for SeDS.

Principle 3: Research related to a given system or disease, including fundamental studies, should be clustered for review within a single IRG

- 250,000 deaths from SeDS (sedentary environmental death syndrome) is a given disease syndrome that has no NIH clustering
- Dr. Ehrenfeld has already concluded that “several **appreciative ‘homes’**” exist
- We need to ensure that SeDS be **clustered** into one study section

A reductionist only reviewer for the review of those grants using a balanced reductionistic and integrative approach is not an “appreciative” home

Principle 4: Organization should be flexible enough to adjust to rapid changes in scientific opportunities in the years ahead

■ Opportunity now:

- 250,000 SeDS deaths/yr (12% of US deaths)**

■ Adjustments for now

- Immediately at least one dedicated study section on SeDS**
- An additional 25 million dollars dedicated to SeDS research in FY 2002**
- New training grants for SeDS**
- An across the NIH Institute plan within one year to end SeDS**

**The rumor is that there are not
enough exercise grants for a
dedicated exercise study section**

286 NIH grants are funded with a major theme of exercise

■ NIA (Aging)	71
■ NHLBI (Heart Lung)	61
■ NIDDK (Diabetes)	47
■ NCRR (Rehab)	35
■ NIAMS (Arthritis)	15
■ NINR (Nursing)	13
■ NCI (Cancer)	13
■ NICHD (Child Dev)	11

Conservative approach leads to conclusion that there are now enough exercise grants for a dedicated exercise study section

- Selected 286 titles from 940 exercise “hits” on NIH CRISP
- 286 funded \times 4 funded & unfunded = 1144
1144 total grants submitted \div 4 yrs/grant = 286/yr
286 \div 3 study sections/yr = 95 grants/meeting
- If there was a desire to delay 250,000 SeDS deaths/yr, all NIH has to do is fight 12% of US deaths each yr is to admit that 250,000 SeDS deaths are high impact to those dying

Point: exercise is not a disease...why devote NIH resources to exercise biology when the answer is already known...exercise is beneficial?

Counterpoint: The critical question is how does exercise prevent disease.

Objectives:

- basic biology of cellular function - matching energy needs with energy supply
 - Important areas in cancer and angiogenesis
- identifying “health promoting” biochemical pathways that are shut down with inactivity
- defining precise exercise prescriptions for targeted populations
- Ammunition to pressure for change!

How to accomplish this vision when there is a lack of action?

10 August 2000 editorial in *Nature* wrote:

“Scientists should remember this lesson from the Kansas campaign to allow the teaching of evolution; raise your voices, and make politicians listen...scientists ‘had to be dragged kicking and screaming’ to join the effort. They believed the answer was to educate people, failing to see that it was a political issue...It takes those with strong personal commitment...the Kansas victory is just one demonstration that it is worth it.”

RID is Researchers against Inactivity-related Diseases

www.ridinactivity.org

- 140 members in RID
- Two petition drives to Dr. Ehrenfeld
- Letter campaign for IOM study of **SeDS**
- Been to Capital Hill 3 times in last 10 mo.
- Planning a 50-person trip to Capital Hill to meet Congress on 1 June 2001 during Baltimore ACSM meeting
- WEB site
- t shirts for spreading the word

“In Phases 1 and 2 we are also relying heavily on input from the broad scientific community” Draft of Phase 1 Report

Our input to NIH

- ***Ensure a SeDS study section now***

“However, new study sections may be added to some of the IRGs in Phase 2.” Phase 1 Final Report

- ***Ensure an additional 25 million dollars dedicated to SeDS research in FY 2002***

- ***Ensure new training grants for SeDS***

- ***Ensure a written NIH plan by Dec 31, 2001 to end SeDS***