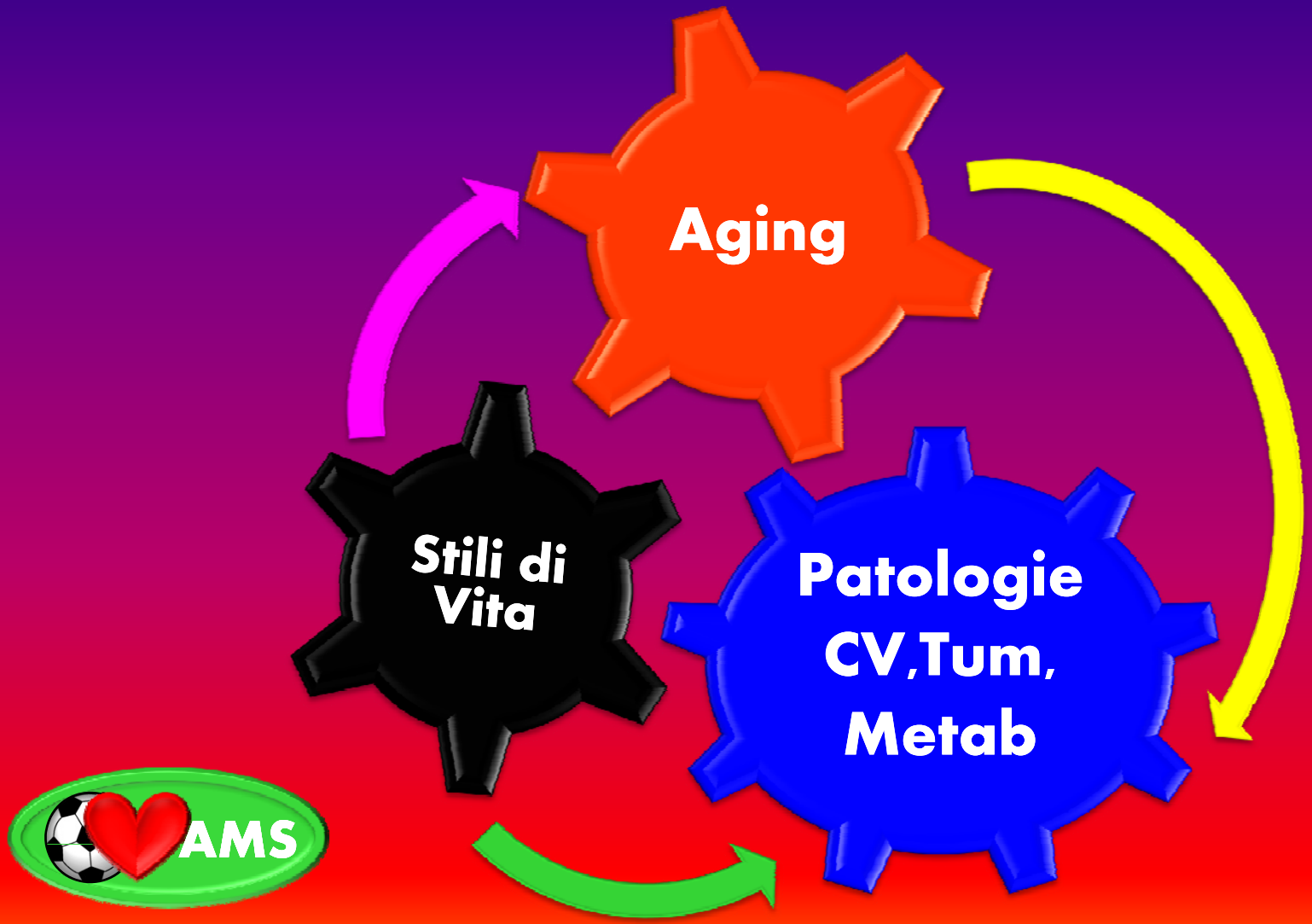
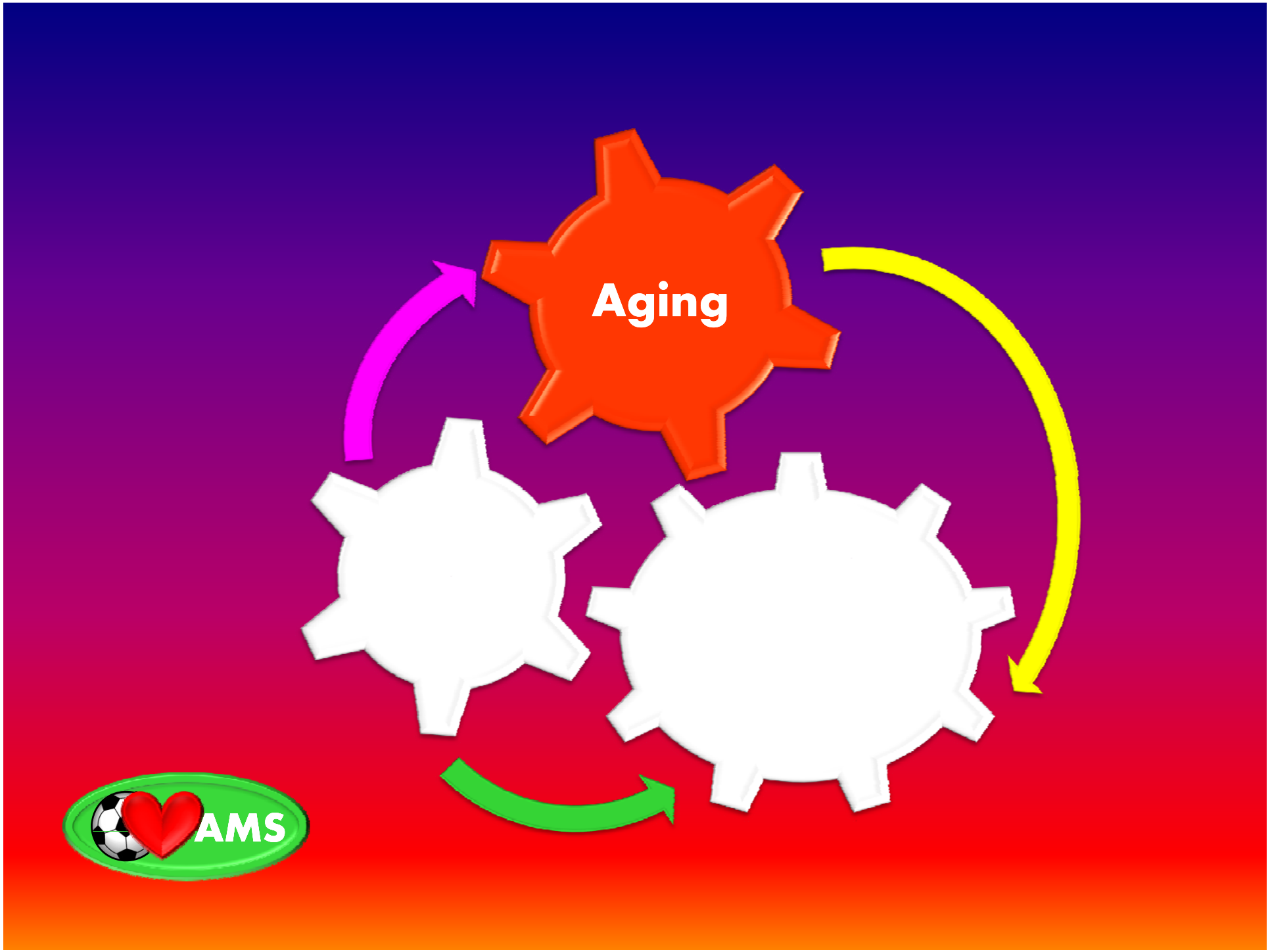
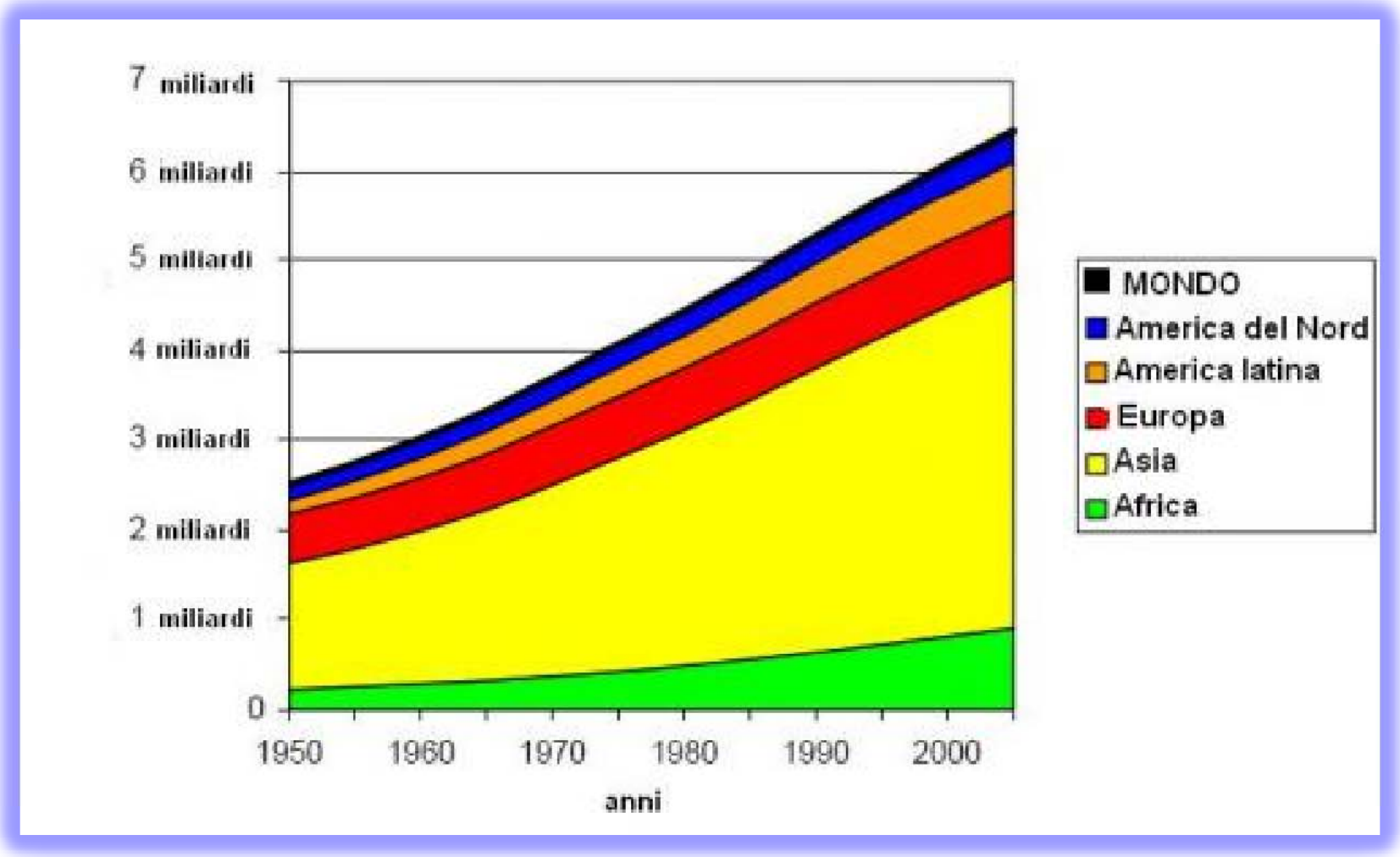
L’evoluzione,la medicina,lo sport

Campi di azione dell'attività fisica

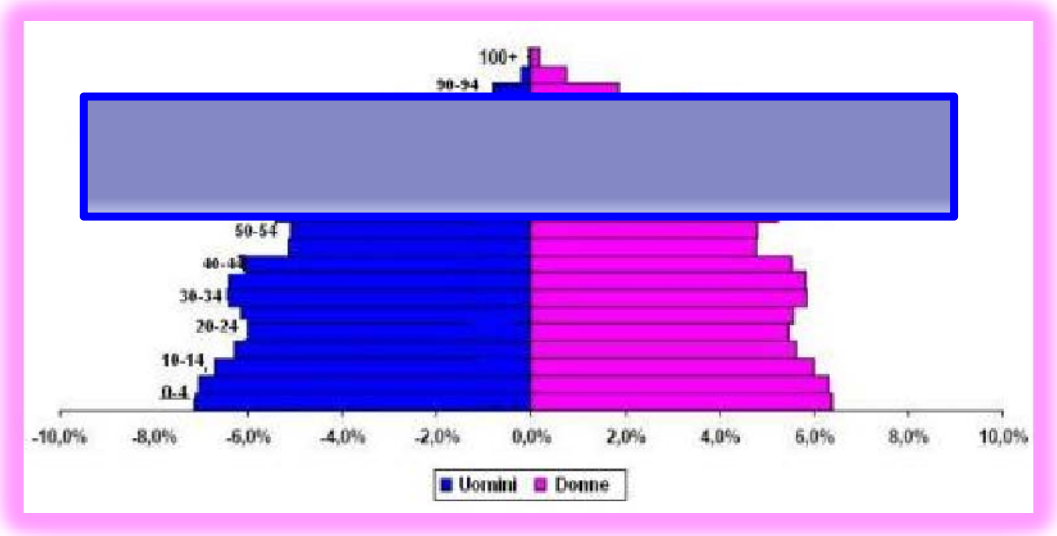



Aging
AMS

Popolazione nel Mondo

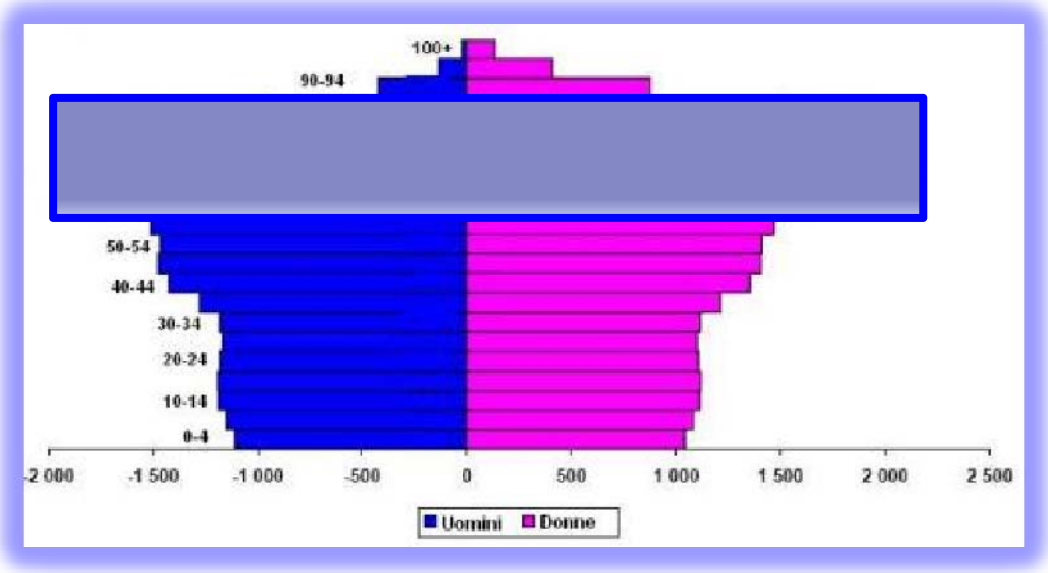


Piramide delle età nel 2050

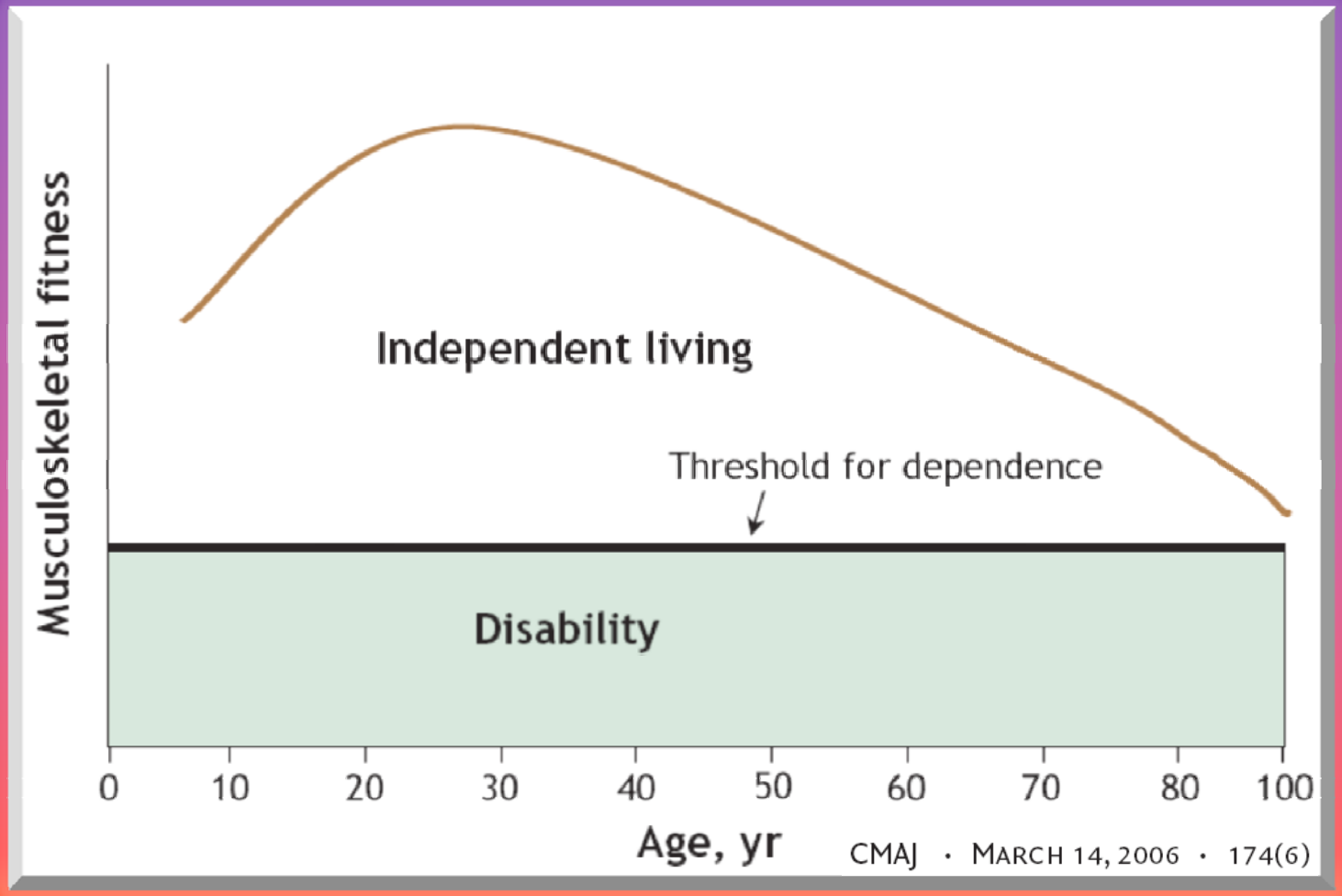


Europa

Italia



Theoretical relation between musculoskeletal fitness and independent living across a person's lifespan



ORIGINAL INVESTIGATION

The Association Between Physical Activity in Leisure Time and Leukocyte Telomere Length

Lynn F. Cherkas, PhD; Janice L. Hunkin, BSc; Bernet S. Kato, PhD; J. Brent Richards, MD; Jeffrey P. Gardner, PhD; Gabriela L. Surdulescu, MSc; Masayuki Kimura, MD, PhD; Xiaobin Lu, MD; Tim D. Spector, MD, FRCP; Abraham Aviv, MD

Conclusions: A sedentary lifestyle (in addition to smoking, high body mass index, and low socioeconomic status) has an effect on LTL and may accelerate the aging process. This provides a powerful message that could be used by clinicians to promote the potentially antiaging effect of regular exercise.

Arch Intern Med. 2008;168(2):154-158

The normal age-associated decline in cardiovascular performance

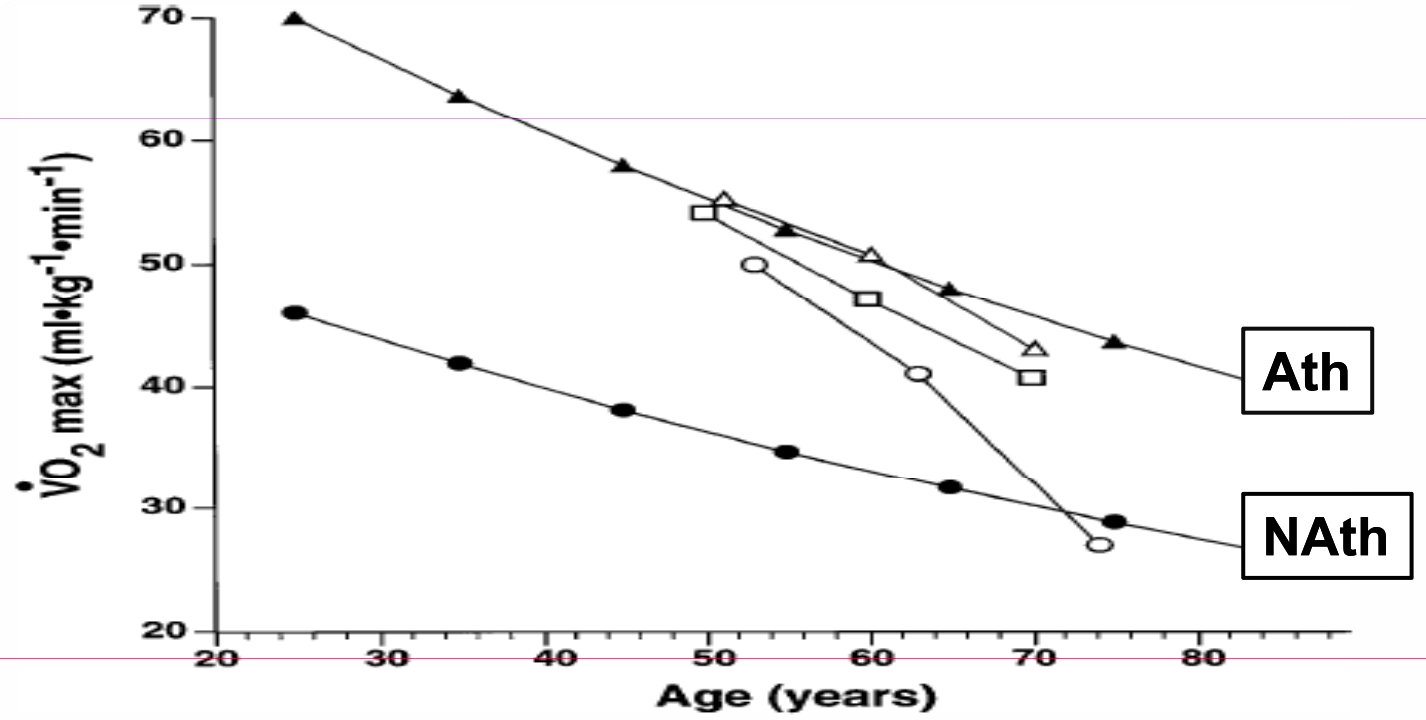
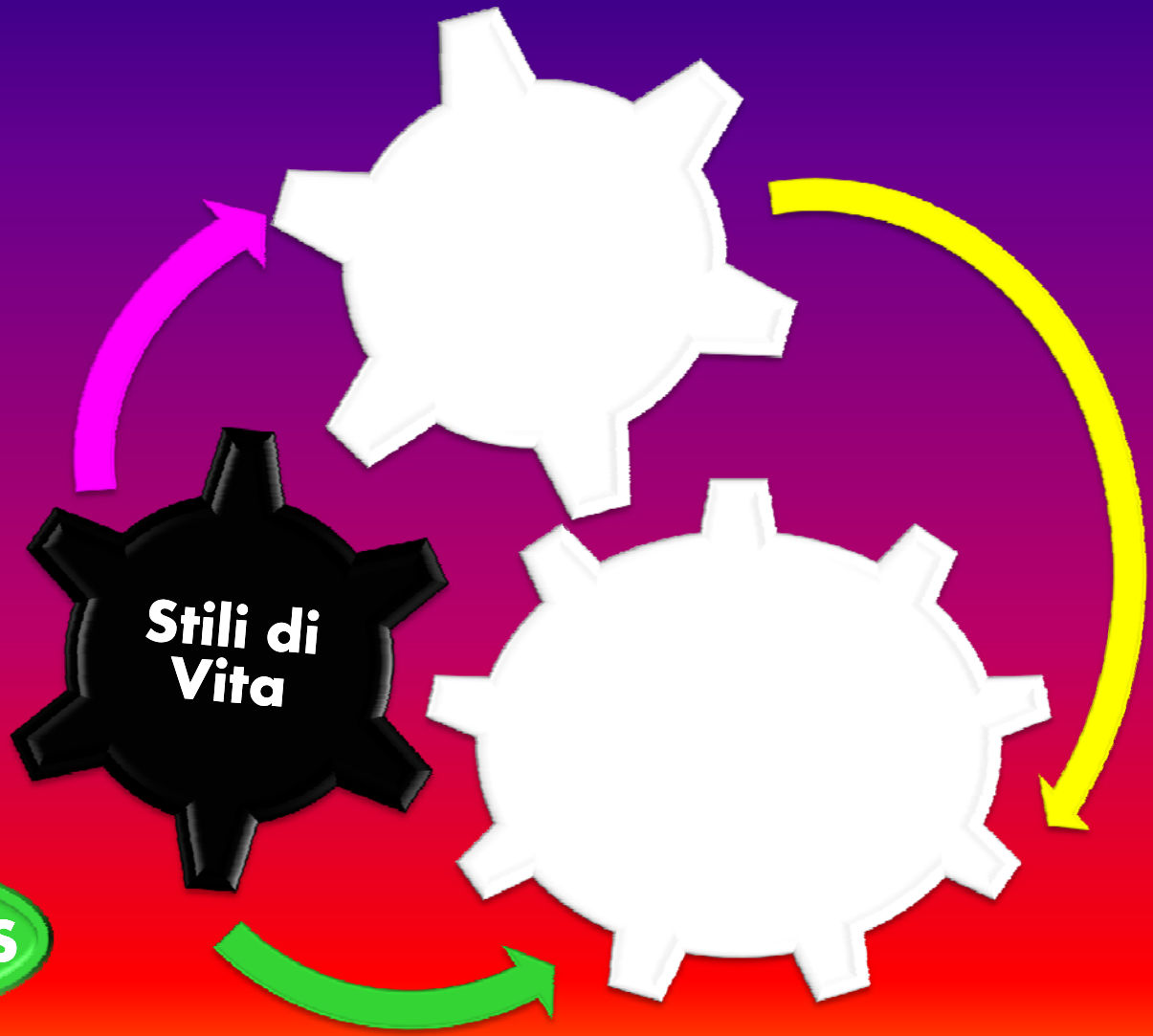


Fig. 1. Maximal oxygen uptake ($\dot{V}O_{2max}$) of older endurance athletes who continued to train at a high (△), moderate (□), or low intensity (○) after 10- and 20-yr follow-ups (present study). Curves for athletes (▲) and untrained healthy persons (●) are cross-sectional norms from Heath et al. (9).

J Appl Physiol 82:1508-1516, 1997

Importanza dell’attività fisica



AMS

Evidence

There is incontrovertible evidence that regular physical activity contributes to the primary and secondary prevention of several chronic diseases and is associated with a reduced risk of premature death.

There appears to be a graded linear relation between the volume of physical activity and health status, such that the most physically active people are at the lowest risk.

However, the greatest improvements in health status are seen when people who are least fit become physically active.

The Harvard Alumni Health Study

Age-adjusted incidence rates and relative risks of first heart attack in men according to physical activity

Physical Activity (Kcal per week)	Number of events	Incidence rate (per 10.000)	Relative risk
≤ 2000	307	57.9	1.64
≥ 2000	122	35.3	1.00 (ref)

The Aerobics Center Longitudinal Study

Age-adjusted rates and relative risks of cardiovascular disease mortality in men and women according to physical fitness

Physical fitness	Mortality rates (10.000)	Relative risk
Men		
1	24.6	1.00 (referent)
2 and 3	7.8	0.32
4 and 5	3.1	0.13
Women		
1	7.4	1.00 (referent)
2 and 3	2.9	0.39
4 and 5	0.8	0.11

JAMA 262:2395-2401, 1989

The Lipid Research Clinics

Mortality Follow-up Study

Rates and relative risks of cardiovascular disease mortality in men according to physical fitness

Physical Fitness	Mortality rates (x 100)	Relative risk
1	221	8.5
2	156	6.0
3	130	5.0
4	26	1.00 (referent)

N Engl J Med 319:1379-1384, 1988

Mortality amongst participants in Vasaloppet: a classical long-distance ski race in Sweden

B. Y. Farahmand1, A. Ahlbom1, Ö. Ekblom2, B. Ekblom2, U. Hållmarker3, D. Aronson3, &G. Persson Brobert4

Conclusions. We conclude that participants in long-distance skiing races, which demand prolonged regular physical training, have low mortality. The extent to which this is due to physical activity, related lifestyle factors, genetics or selection bias is yet to be assessed.

J Intern Med 2003; 253: 276 283.


Physical fitness relates to primary prevention
Moderate amount of exercise may be protective
More active persons appear to be at lower risk

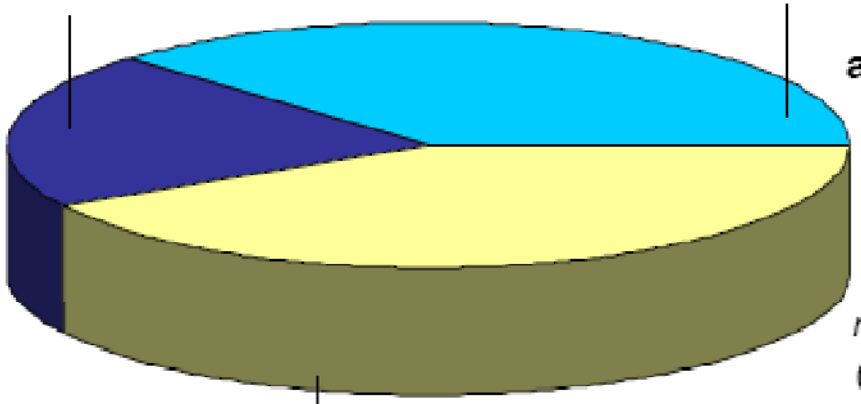
Italia Coni

3. L'attività fisico-sportiva degli italiani nel 2003

Dati Istat 2003 su 55,5 milioni di cittadini di 3 anni e più

pratica sportiva con continuità:
circa 11 milioni e mezzo (20,8 %)

in aumento rispetto al 1999 (2,7% in più)



attività sportive saltuarie/occasionali o qualche attività fisica:
circa
21 milioni
(37,6 %)

in diminuzione rispetto al 1999 (9,1% in meno)

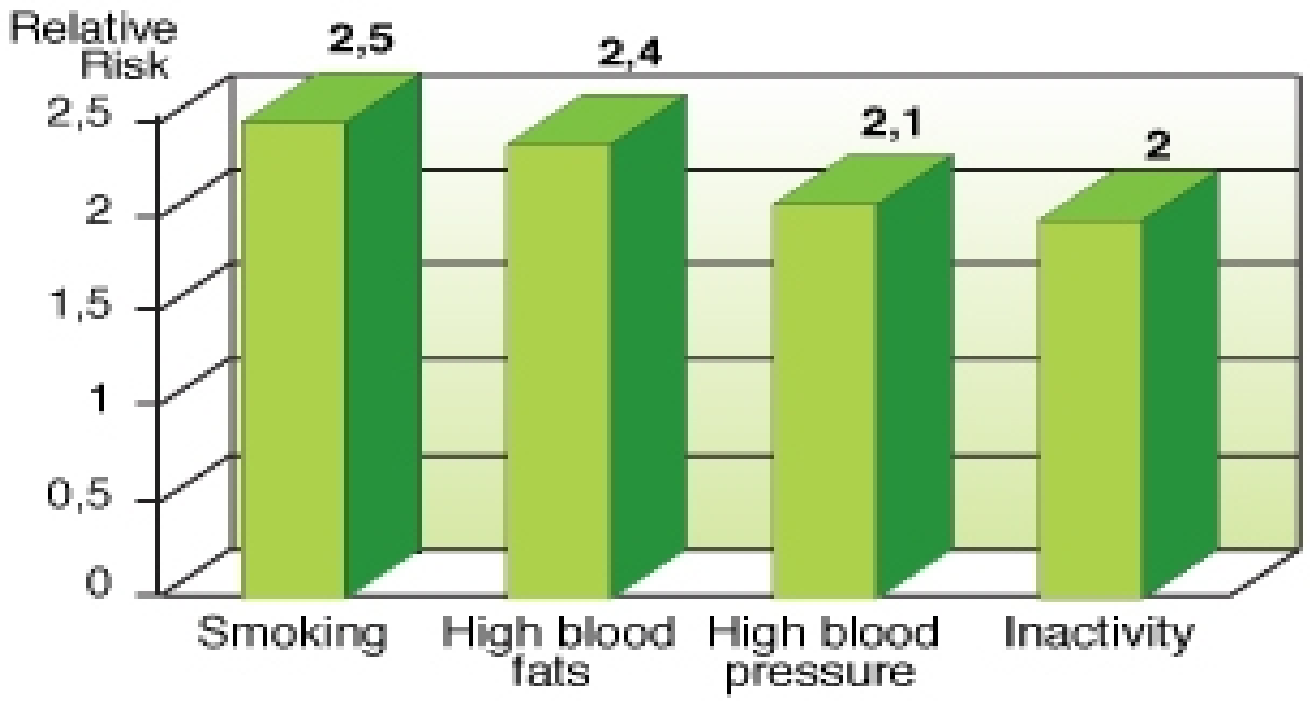
nessuna attività fisica nel tempo libero,
sedentarietà: circa 23 milioni (41,6 %)

in aumento rispetto al 1999 (6,4% in più)

La pratica delle attività fisico-sportive oggi

L'area totale dei cittadini attivi stimata dall'Istat-circa 36 milioni nel 1999-si è ridotta nel 2003 a circa 32 milioni e mezzo, mentre l'area della sedentarietà è salita da 19,5 a 23 milioni (sugli abitanti da 3 anni in su).

PHYSICAL INACTIVITY:
The 4th primary risk factor



Association of physical inactivity with components of metabolic syndrome and coronary artery disease The Chennai Urban Population Study

V. Mohan, K. Gokulakrishnan, R. Deepa, C. S. Shanthirani and M. Datta*

Madras Diabetes Research Foundation,Gopalapuram, Chennai, and *Department of Epidemiology, The Tamil Nadu Dr M.G.R. Medical, University, Chennai, India

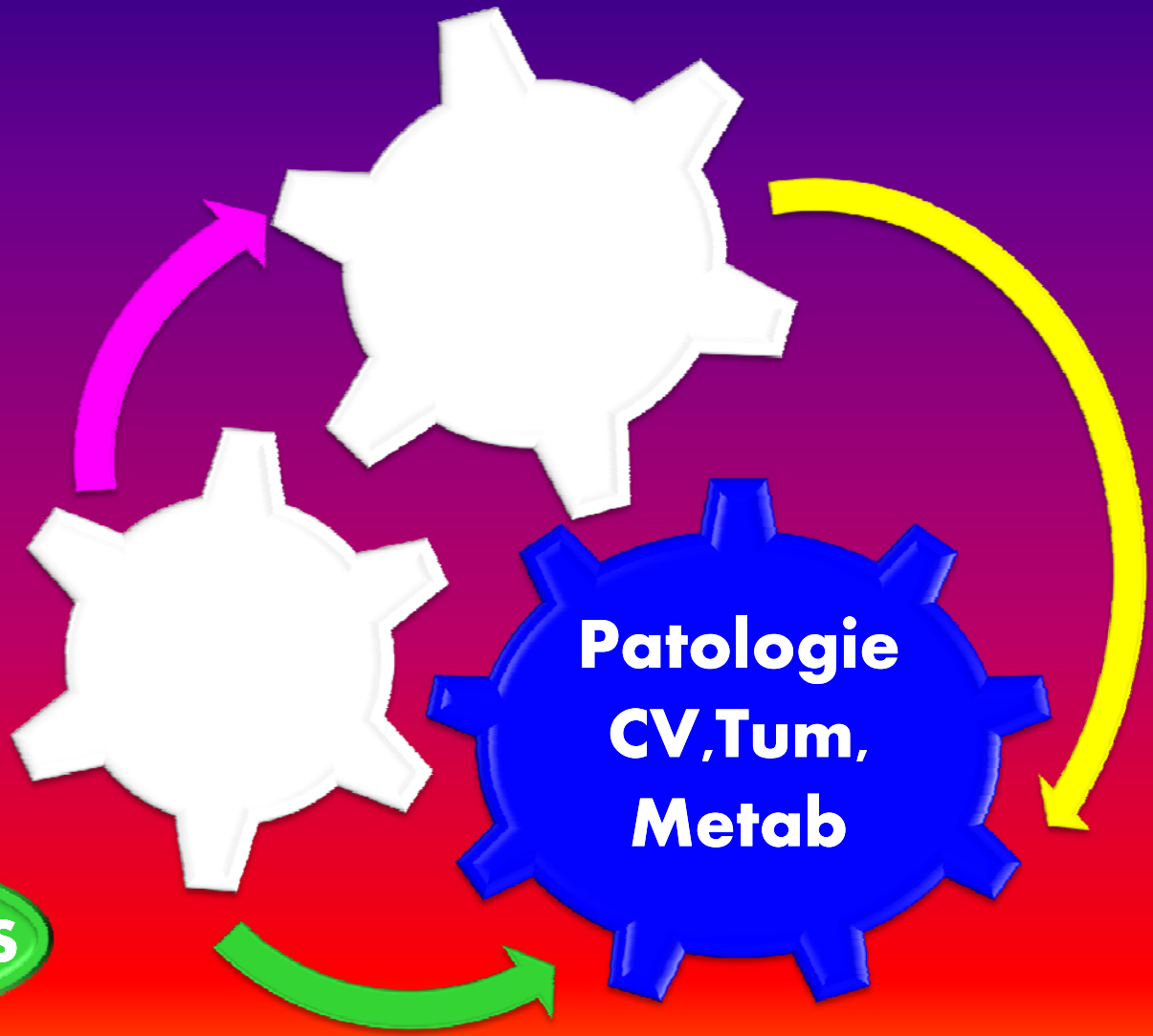
Physical inactivity is associated with the components of MS and CAD in this urban south-Indian population.

Lifestyle changes focusing on increasing physical activity could help to prevent the exploding epidemic of MS and CAD in India.

Diabet. Med. 22, 1206–1211 (2005)

Physical inactivity increases the relative risk of CAD by 45%, stroke by 60%, hypertension by 30%, and osteoporosis by 59%. Our sedentary lifestyle annually produces ~334,000 deaths in the United States and more than 2 million deaths worldwide, representing one of the 10 leading global causes of death and disability

Benefici dell'attività fisica



AMS

Although the underlying mechanisms require additional clarification, it has been suggested that the human genome evolved within an environment of high physical activity for survival. In the current hypokinetic state, inherited metabolic pathways and maladaptive responses may produce metabolic derangements and varied chronic diseases

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Stone Age

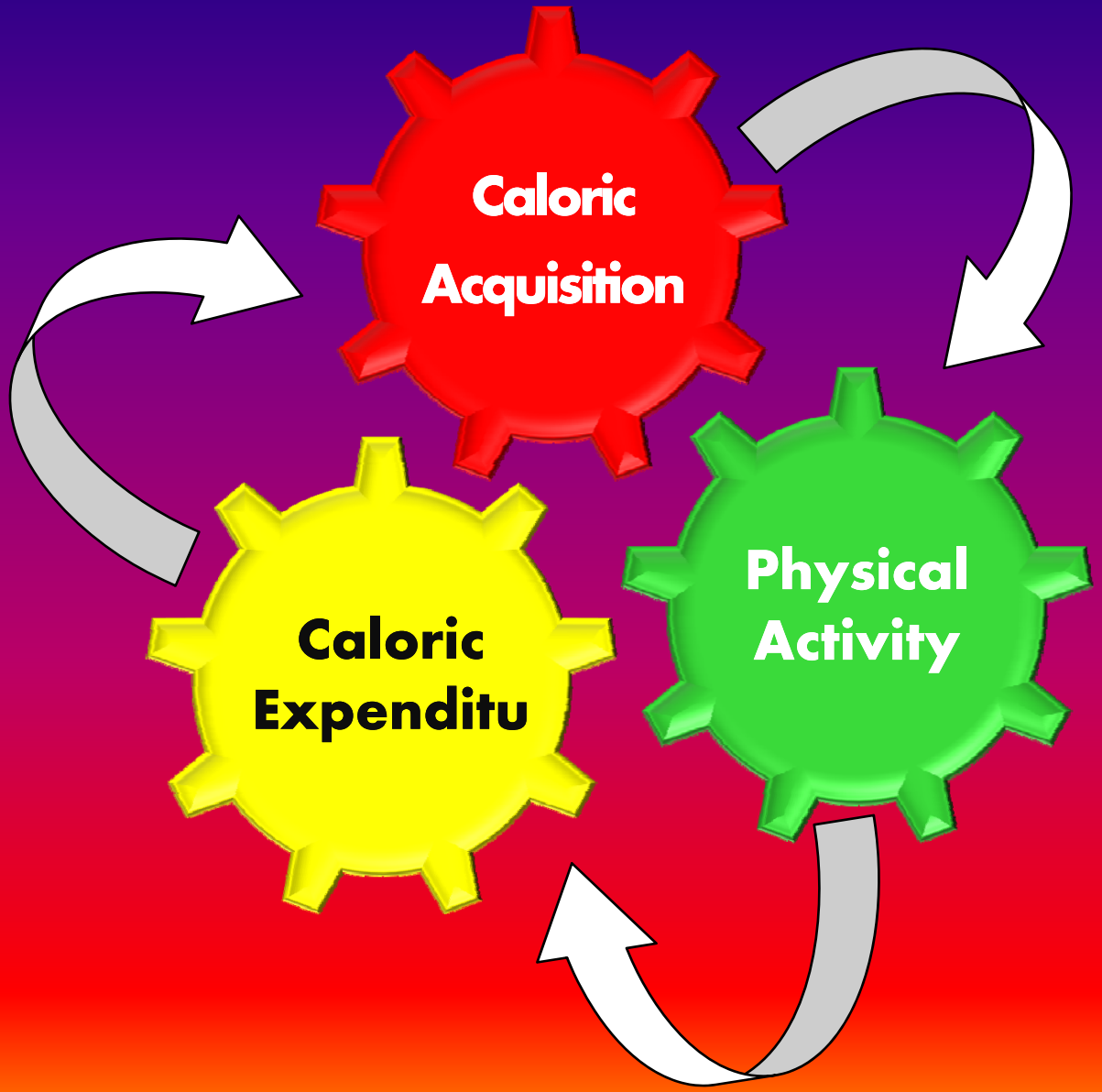
An evolutionary human physical activity: s for health☆

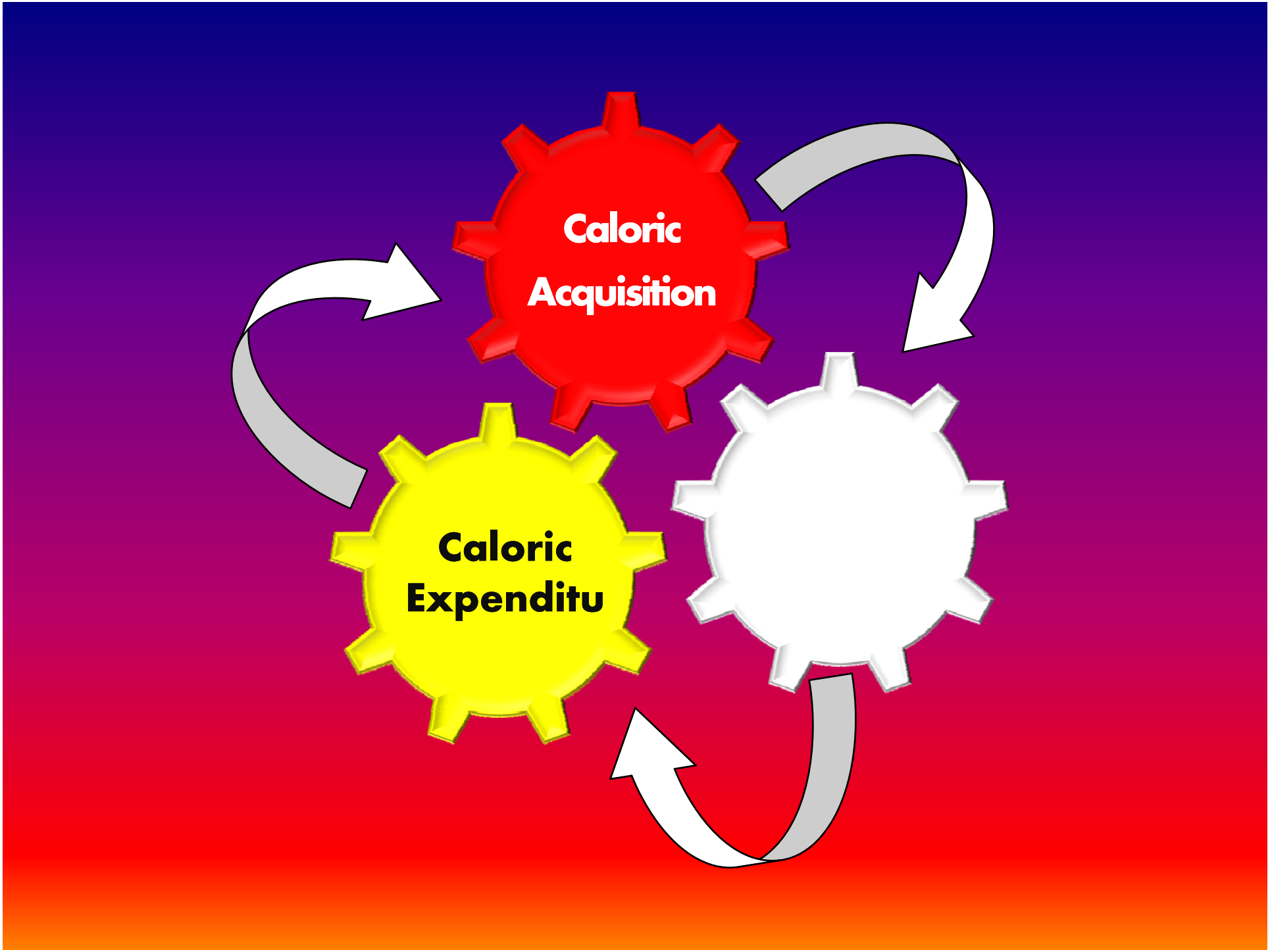
Eaton[a,*], Stanley B. Eaton[b]

[a]Departments of Anthropology and Radiology, Emory University, 2887 Howell Mill Road NW, Atlanta, GA 30327-1333, USA
[b]Science Department, Central Falls High School, Central Falls, RI, USA

Received 5 July 2002; received in revised form 6 July 2003; accepted 6 July 2003

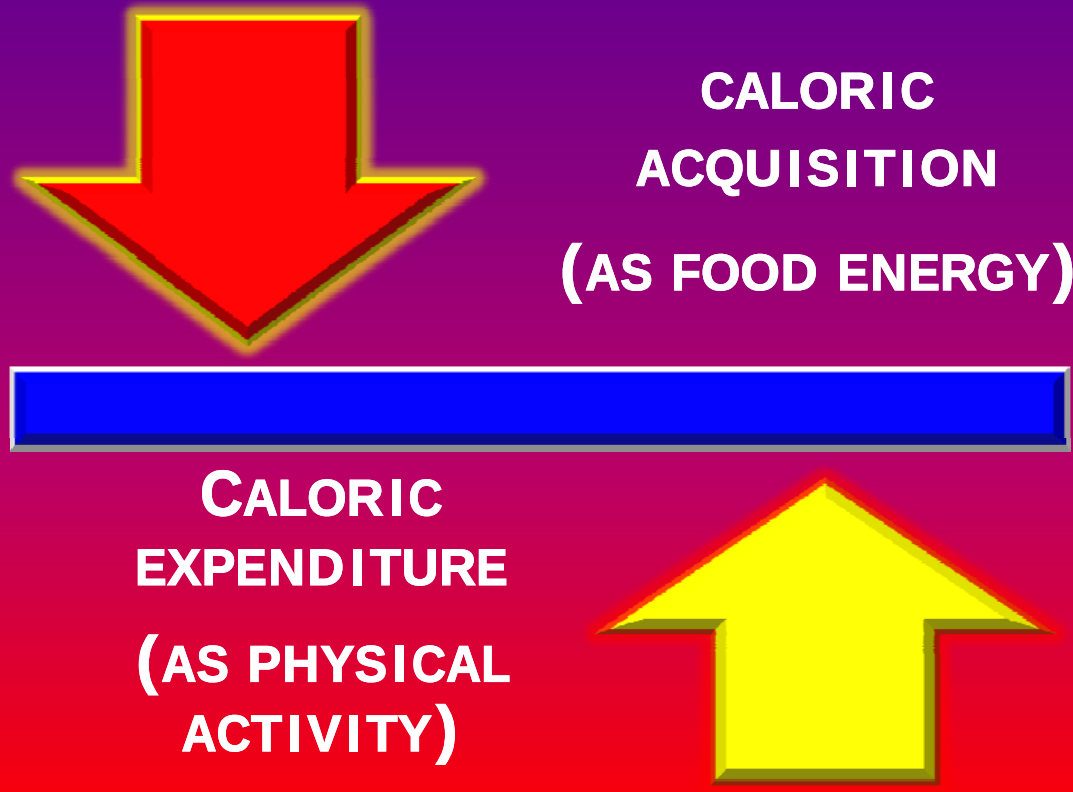
An energy utilization equation




Caloric
Acquisition
Caloric
Expenditu

An evolutionary perspective on human physical activity

Before Domestication



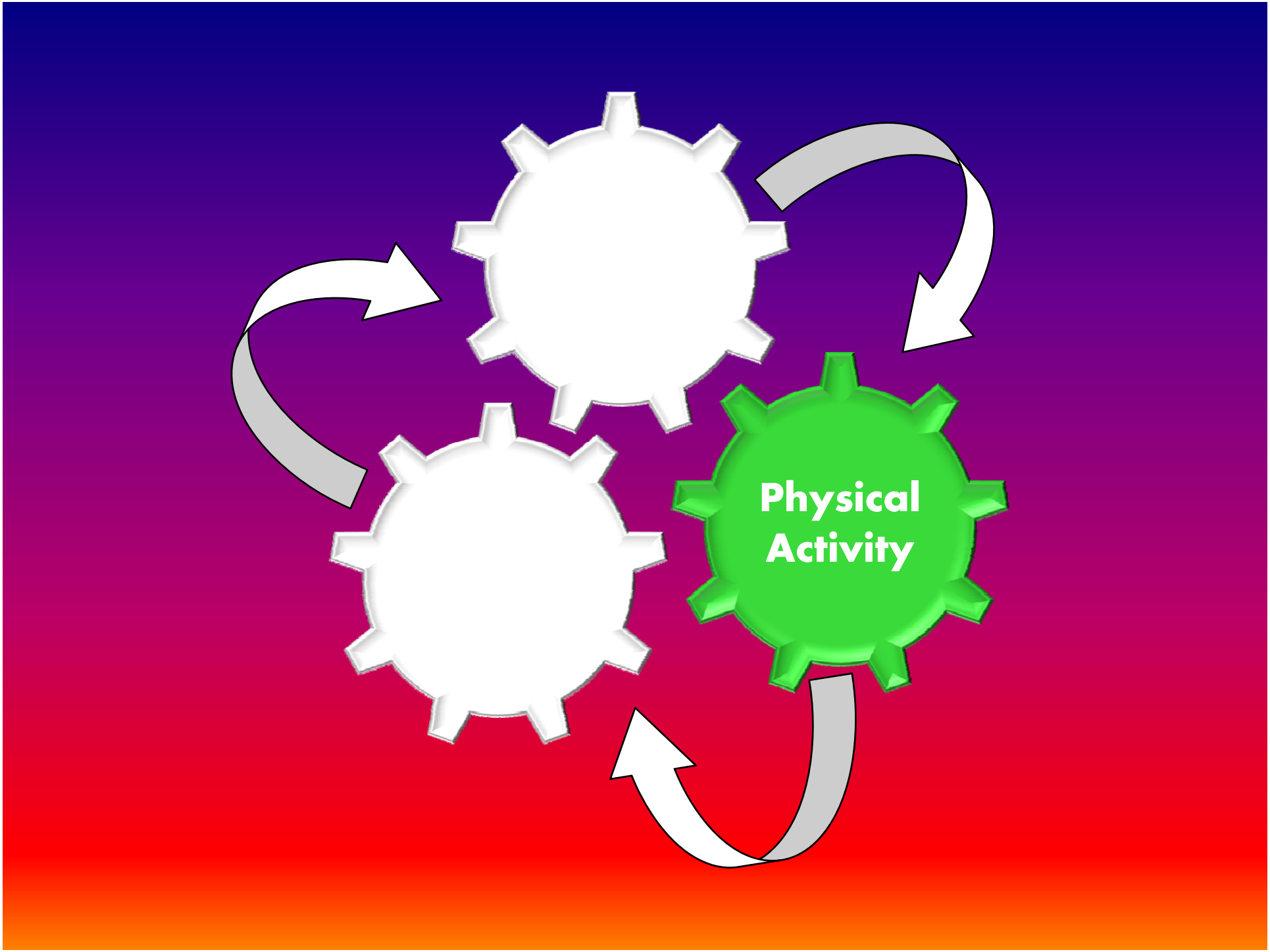
S.B. Eaton, S.B. Eaton / Comparative Biochemistry and Physiology Part A 136 (2003)

Interrelated and interactive influences on insulin sensitivity and/or resistance

$$\text{Insulin Sensitivity} = \frac{(\text{SMM}) \times (\text{SMMA})}{(\text{FM})}$$

SMM = Skeletal Muscle Mass
SMMA = Skeletal Muscle Metabolic Activity
FM = Fat Mass

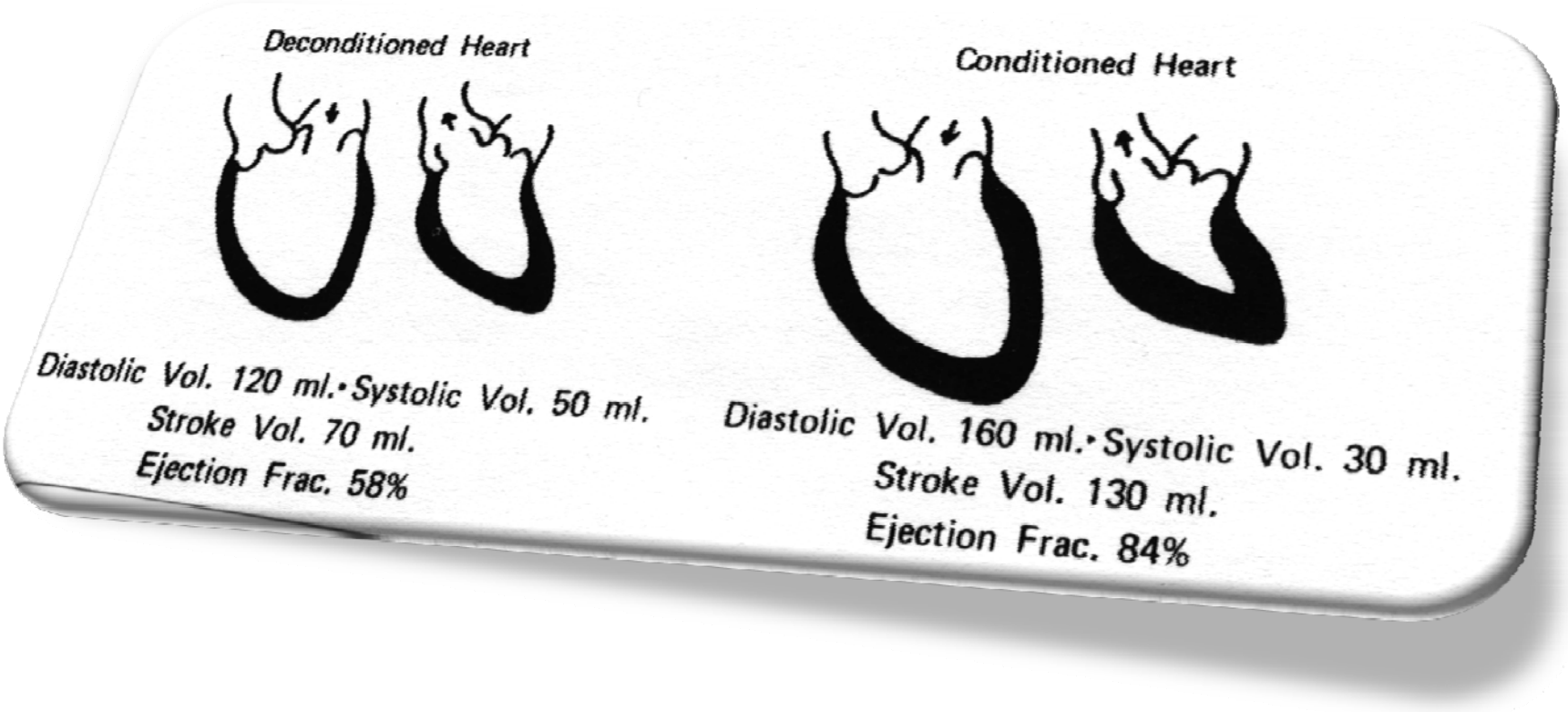
S.B. Eaton, S.B. Eaton / Comparative Biochemistry and Physiology Part A 136 (2003)


Physical
Activity

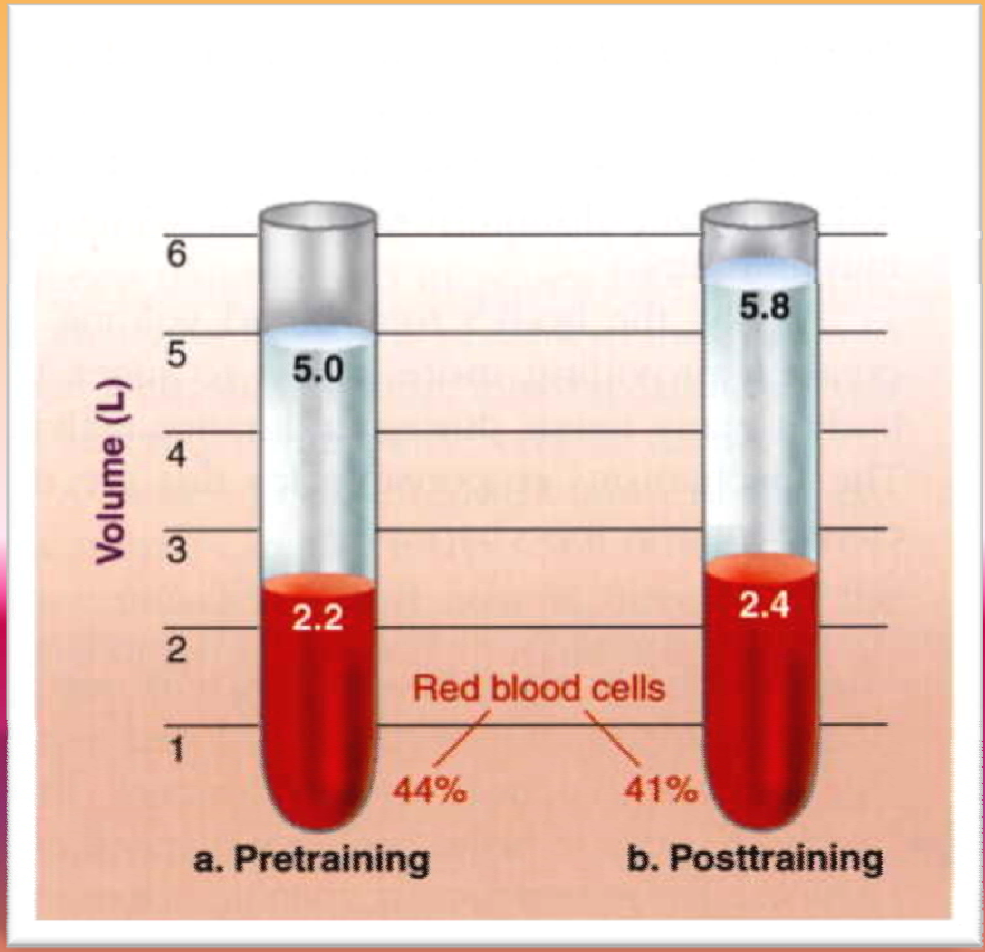
Cardiovascular Function

There are numerous physiological mechanisms that, acting collectively, presumably explain why individuals with greater endurance should be protected. Aerobic exercise elevates blood levels of ‘good’ high density cholesterol, lowers blood pressure and resting heart rate, decreases platelet aggregability as well as the tendency for vasoconstriction, and enhances endothelial health as determined by post-ischemic brachial artery vasodilatation

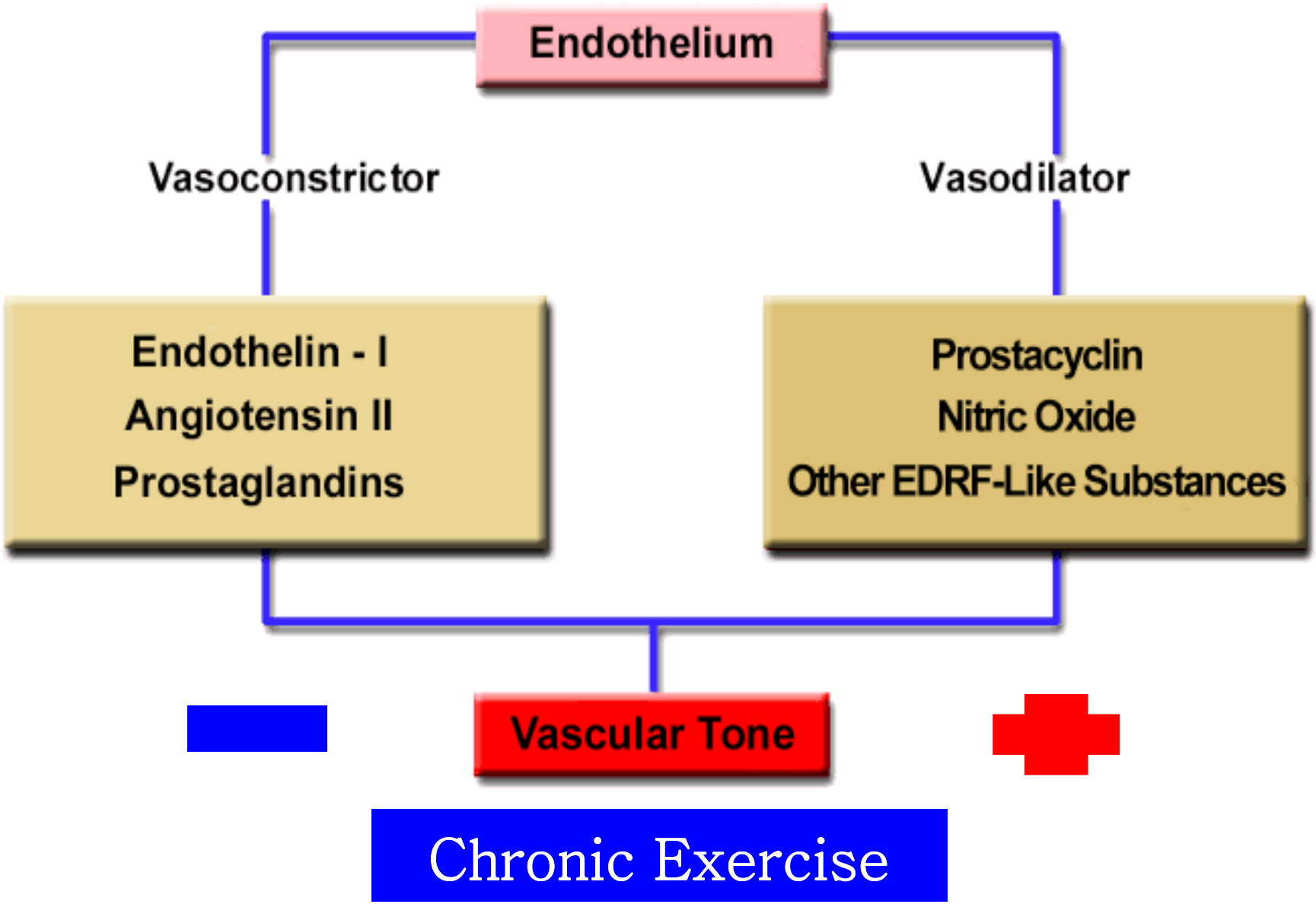
Conditioned Heart



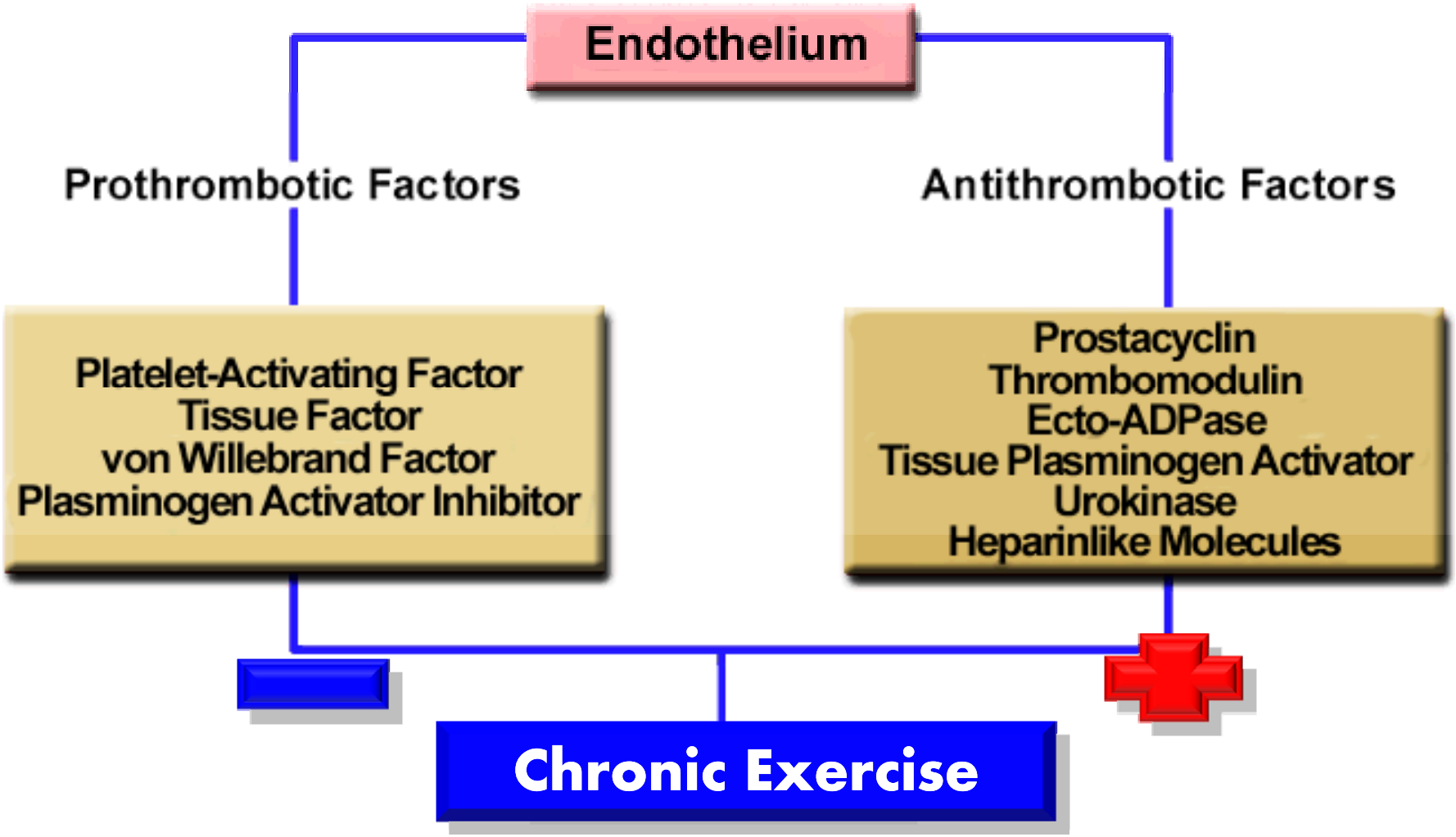
RBC Adaptation to Exercise



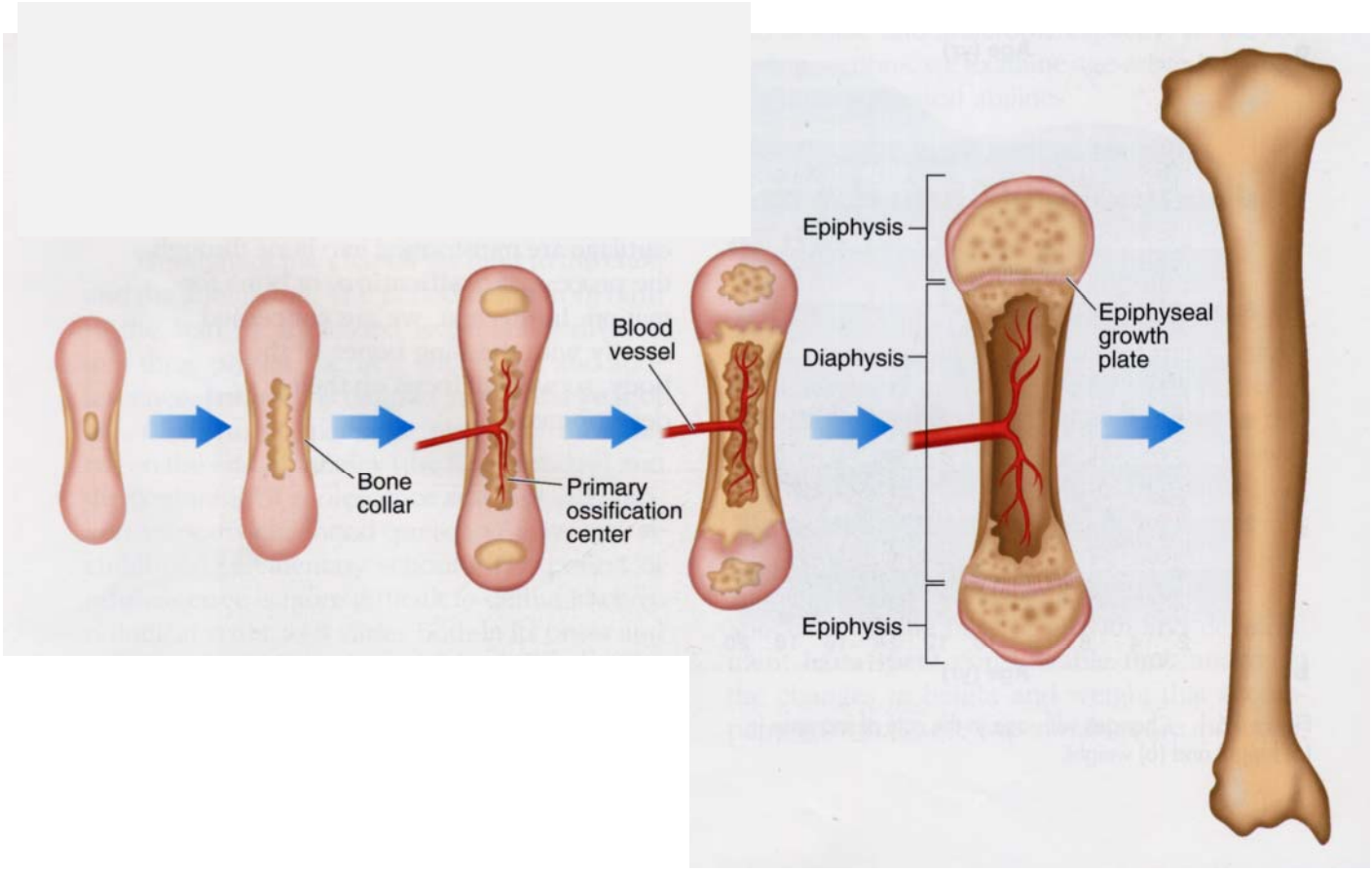
Endothelium and Exercise



Endothelium and Exercise

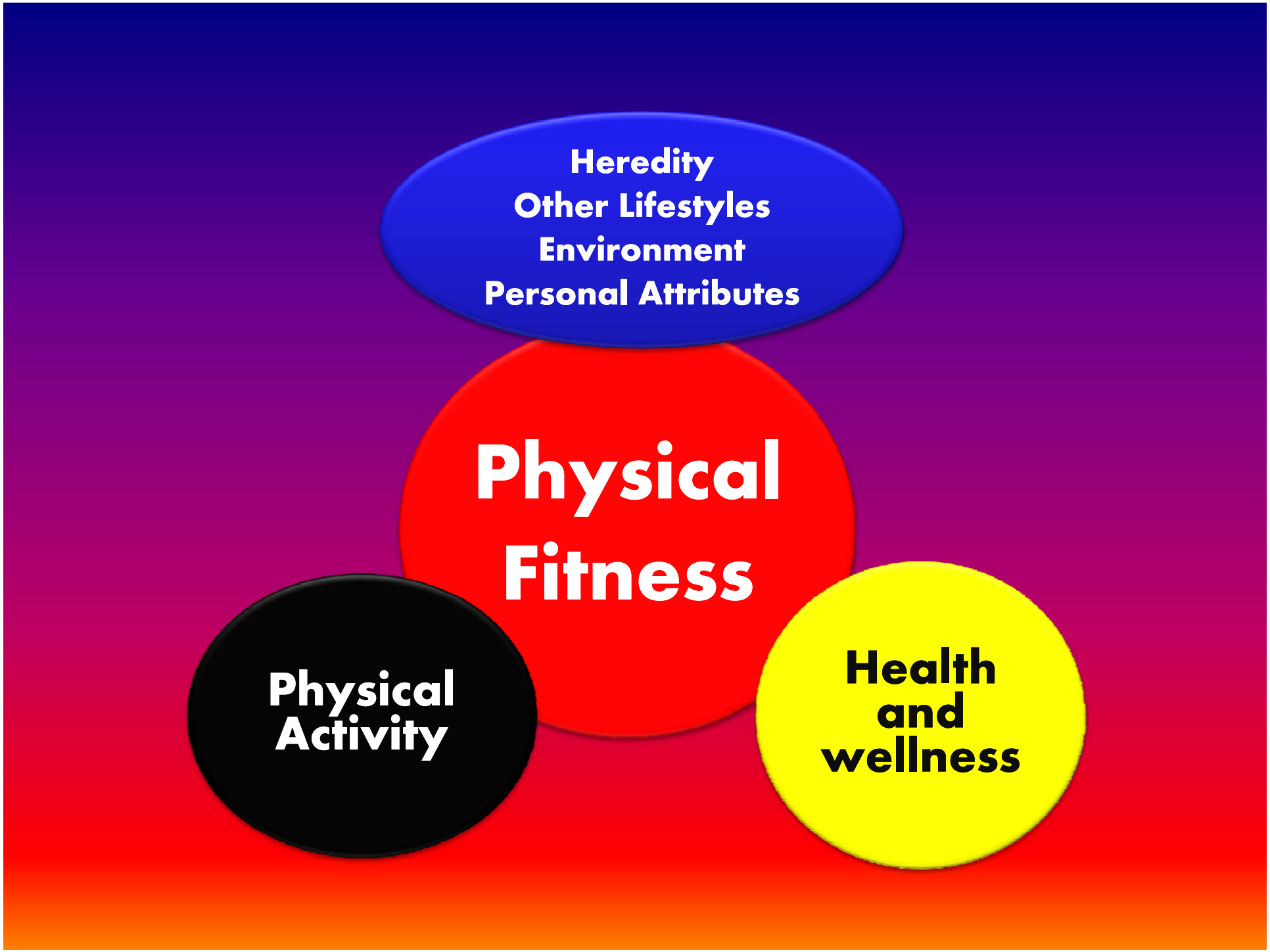


Osteoporosi

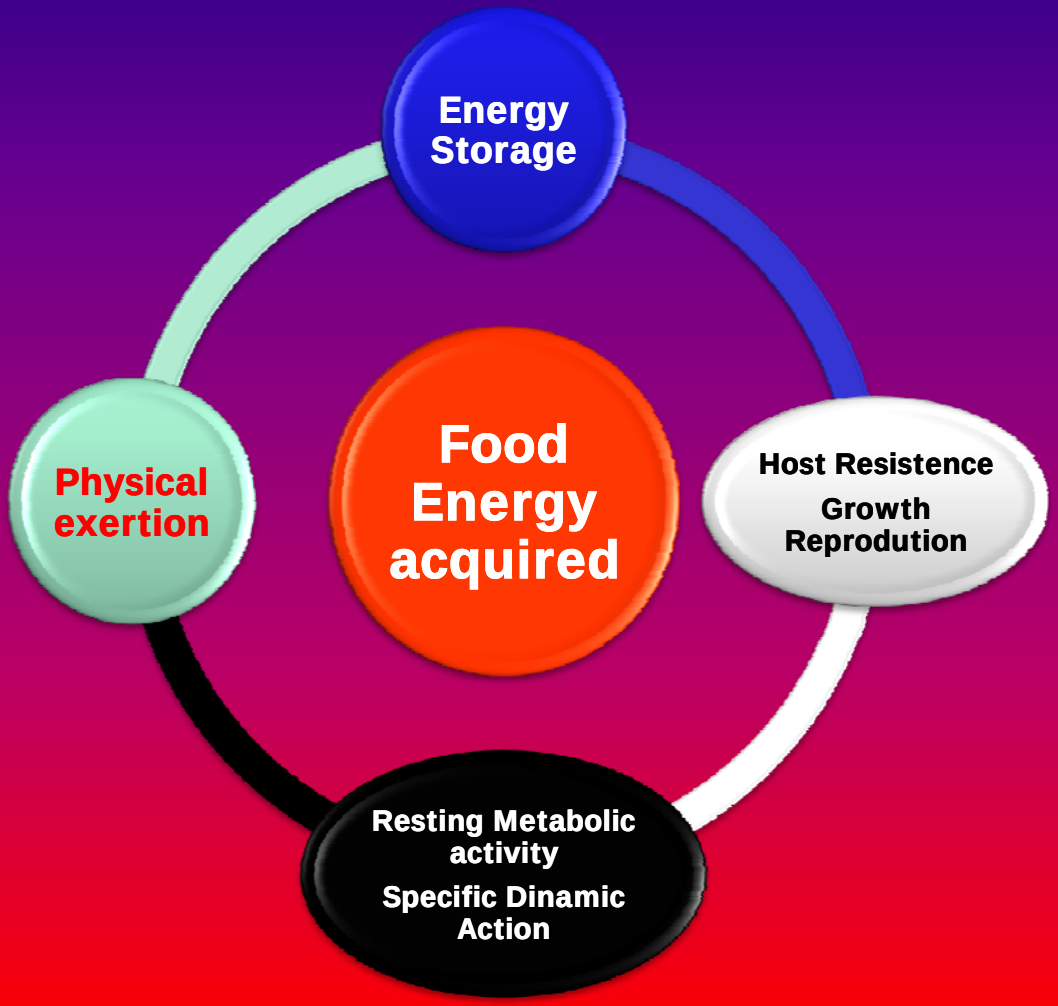


Physical fitness

- The ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and respond to emergencies.
- Physical fitness includes a number of components consisting of cardiorespiratory endurance (aerobic power), skeletal muscle endurance, skeletal muscle strength, skeletal muscle power, flexibility, balance, speed of movement, reaction time, and body composition.

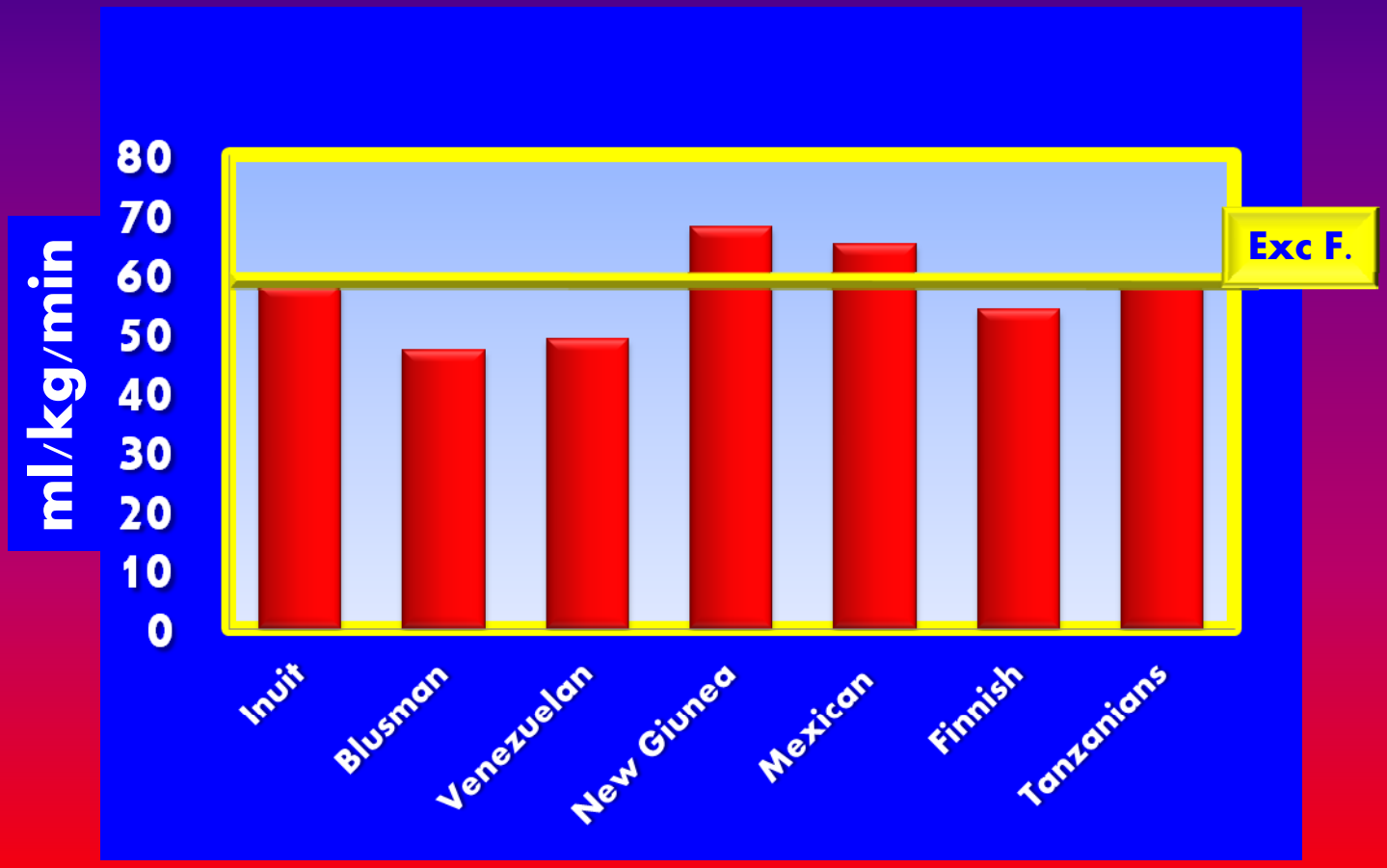

Heredity
Other Lifestyles
Environment
Personal Attributes
Physical Fitness
Physical Activity
Health and wellness

An energy utilization equation



S.B. Eaton, S.B. Eaton / Comparative Biochemistry and Physiology Part A 136 (2003)

FITNESS IN NATIVES



L.Cortain et al Int J Sport Med 1998

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21th Century

An evolutionary uman physical activity: lor health☆

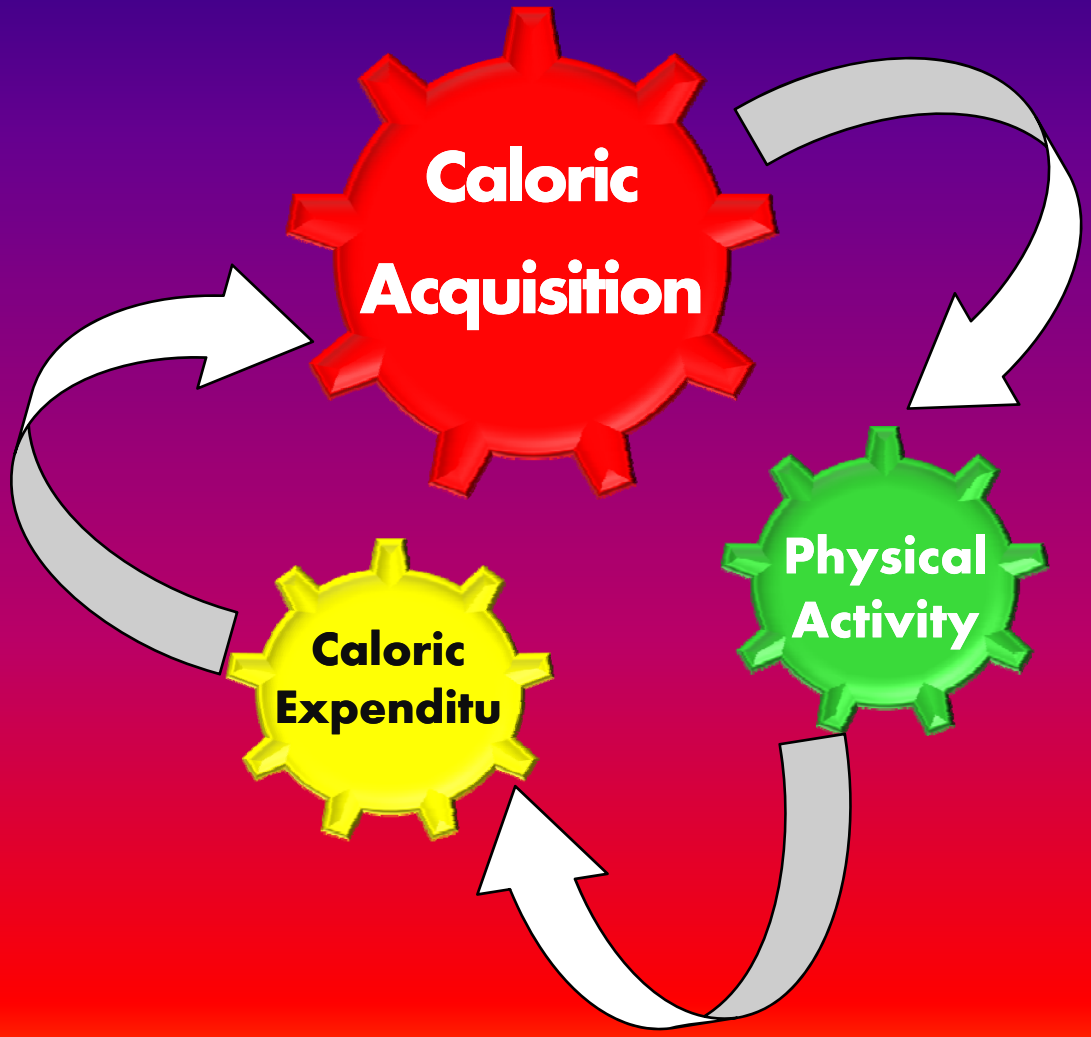
on[a,*], Stanley B. Eaton[b]

[a]*Departments of Anthropology an Emory University, 2887 Howell Mill Road NW, Atlanta, GA 30327-1333, USA*
[b]*Science D ent, Central Falls High School, Central Falls, RI, USA*

Received 5 July 2002; received in revised form 6 July 2003; accepted 6 July 2003

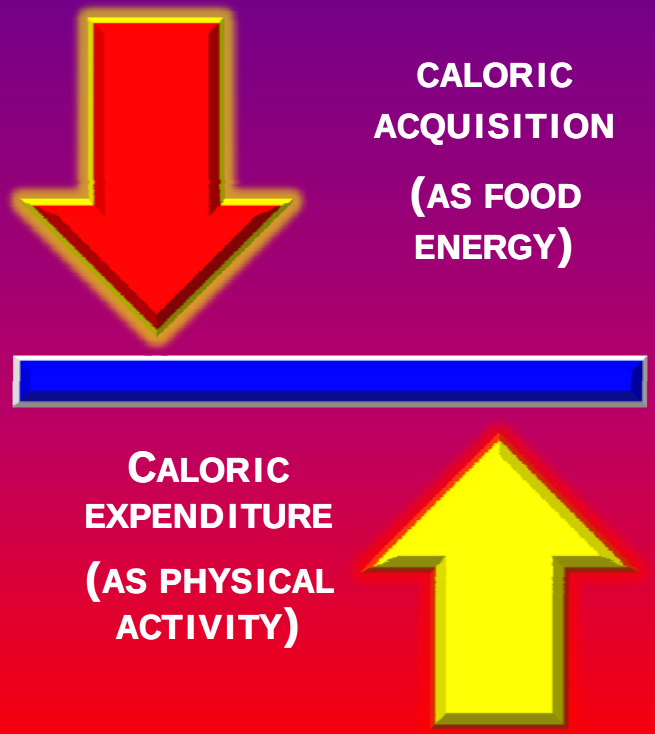
- Physical activity is no longer a requirement for daily living; the relationship between eating and physical work has been abrogated. However, genetic evolution has been wholly unable to match the rapidity of cultural change and our genes remain adapted for conditions that existed during their selection by Darwinian mechanisms
- This discordance or mismatch between our contemporary lives and our genetic makeup has important pathophysiological implications: coronary atherosclerosis, age-related fractures, obesity and ‘syndrome x’ disorders related to insulin resistance are all promoted by physical inactivity

An energy utilization equation

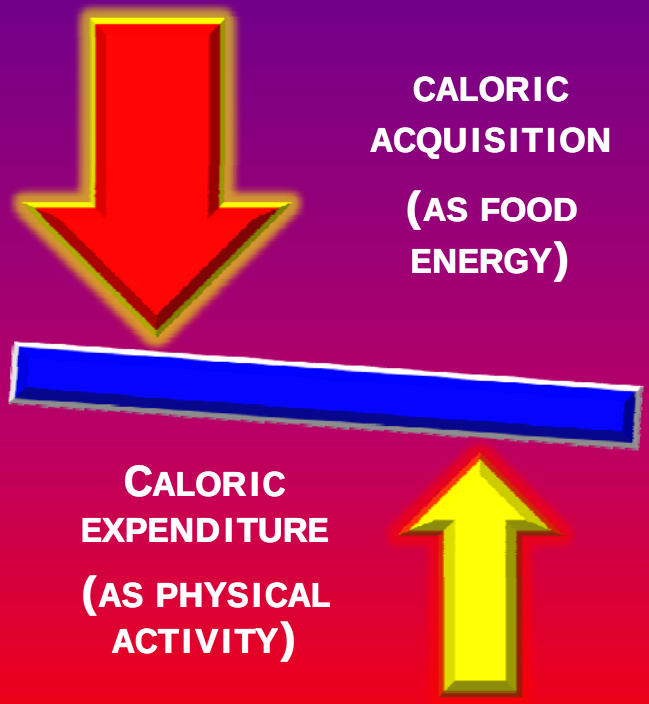


An evolutionary perspective on human physical activity

Before Domestication



20°Century

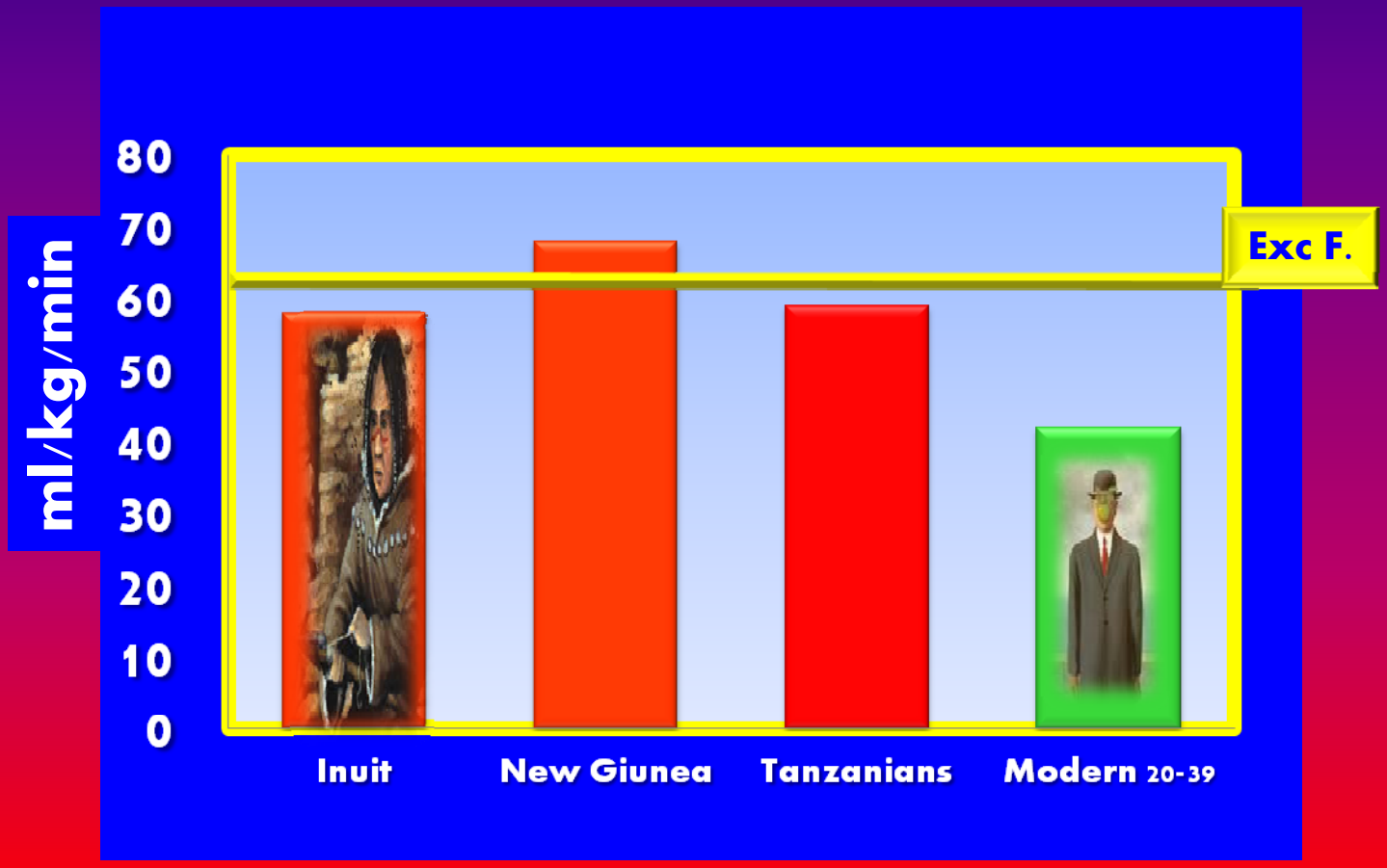


S.B. Eaton, S.B. Eaton / Comparative Biochemistry and Physiology Part A 136 (2003)

Maximal Oxigen Consumption
Car

L. Cordain et al., Int. J. Sports Med 19 (1998)

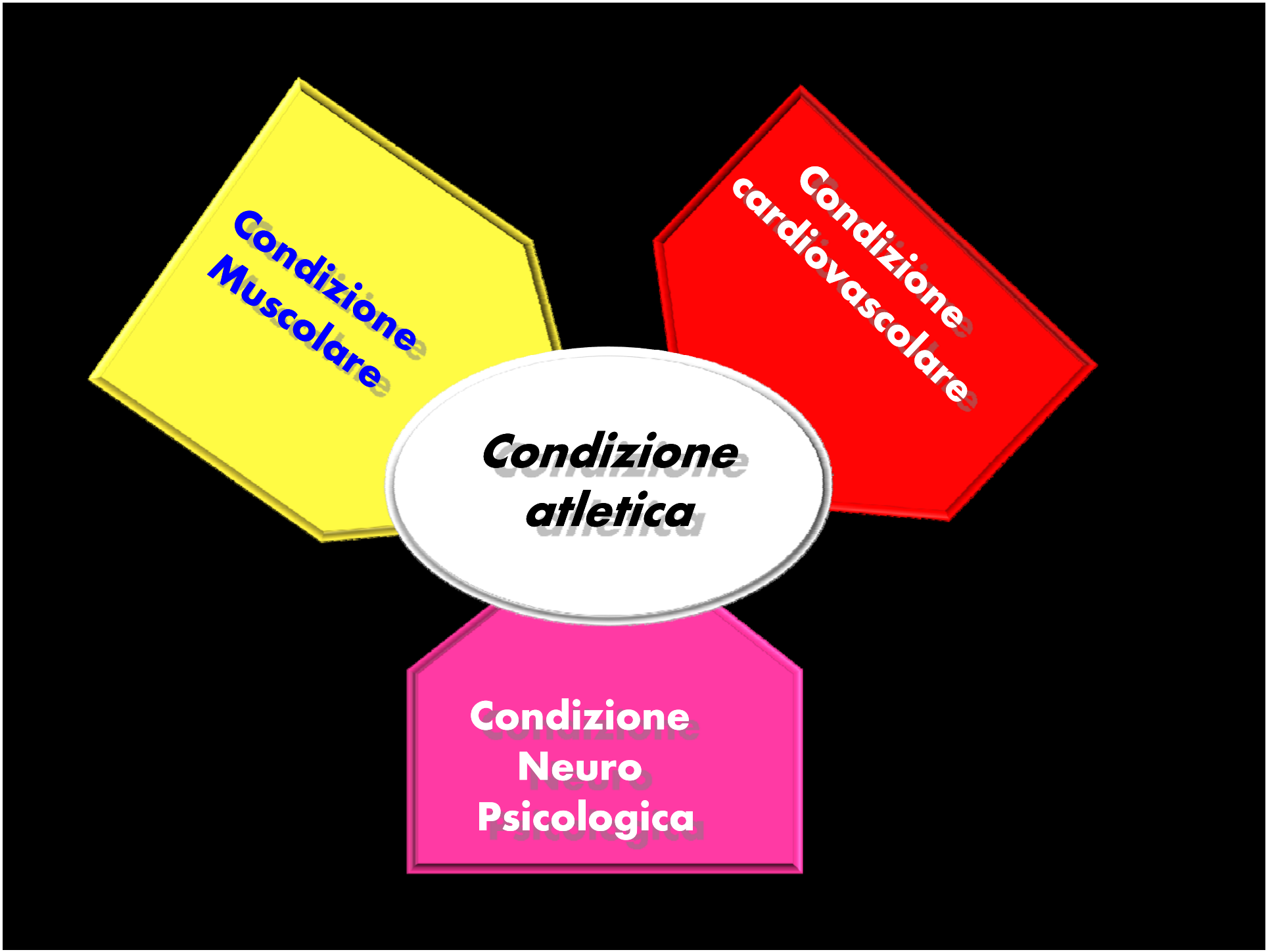
Fitness in Natives and in Urban Male



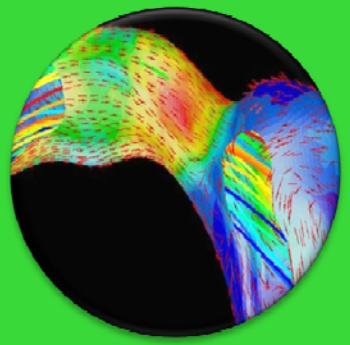
L.Cortain et al Int J Sport Med 1998

“Condizione Atletica”

L’insieme di caratteristiche cardiorespiratorie,neuromuscolari e psicologiche naturali od acquisite, che permettono all’atleta di effettuare la prestazione sportiva con il massimo rendimento e con il minimo pericolo di infortunio.


Condizione Muscolare
Condizione cardiovascolare
Condizione atletica
Condizione Neuro Psicologica

An obligatory and natural linkage

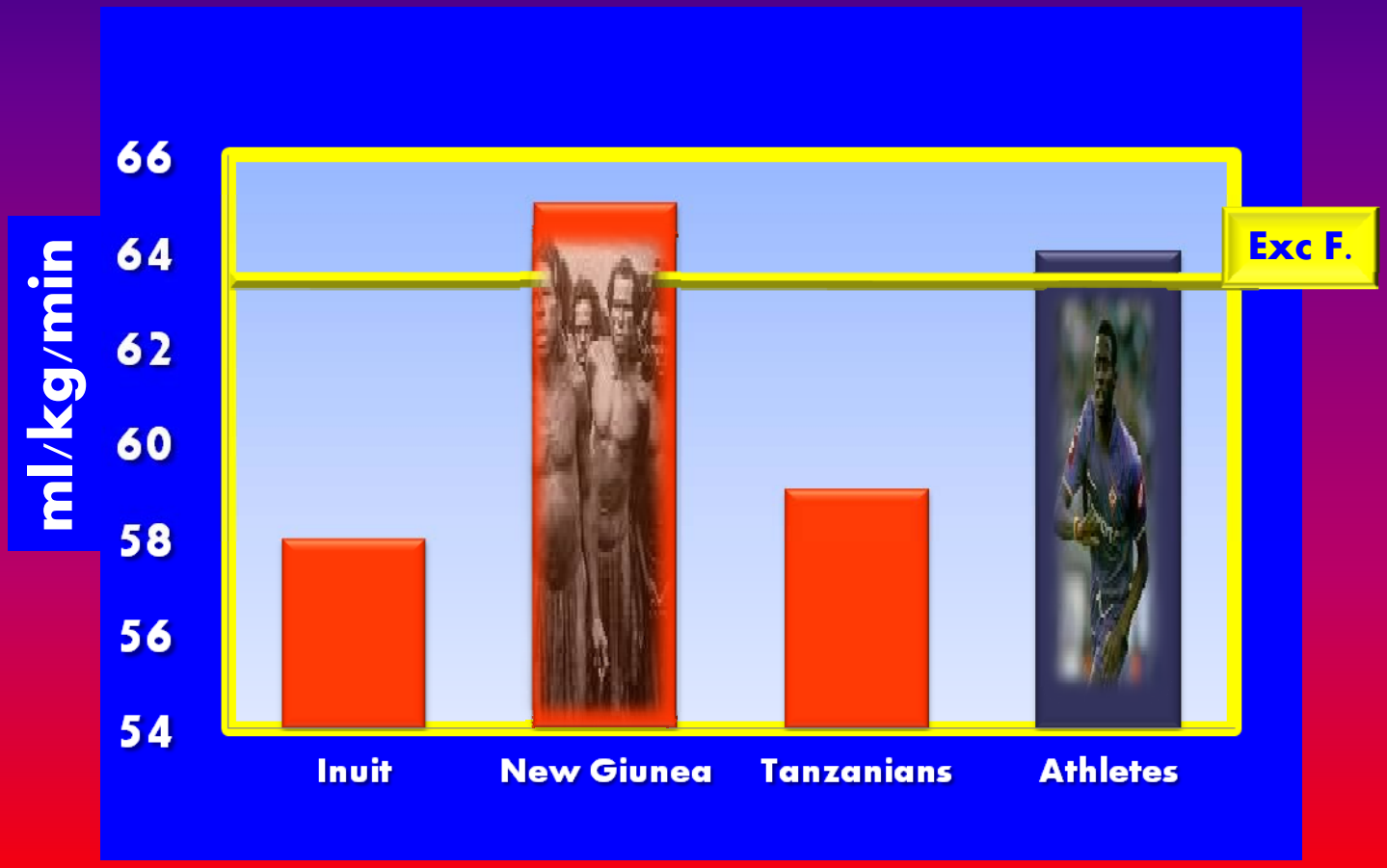


Caloric Acquisition

Physical Activity

Caloric Expenditu

FITNESS IN NATIVES AND IN ATHLETES

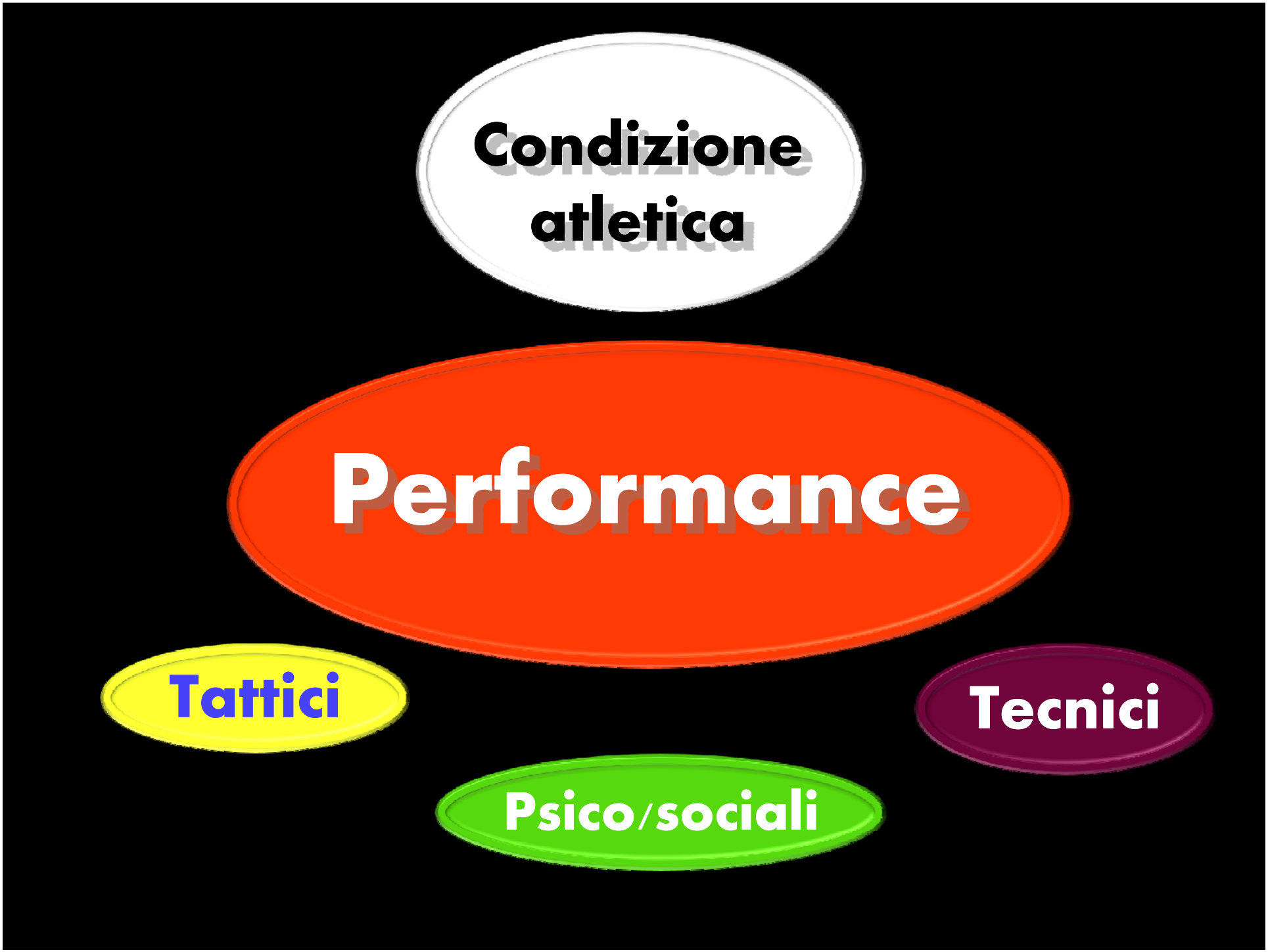


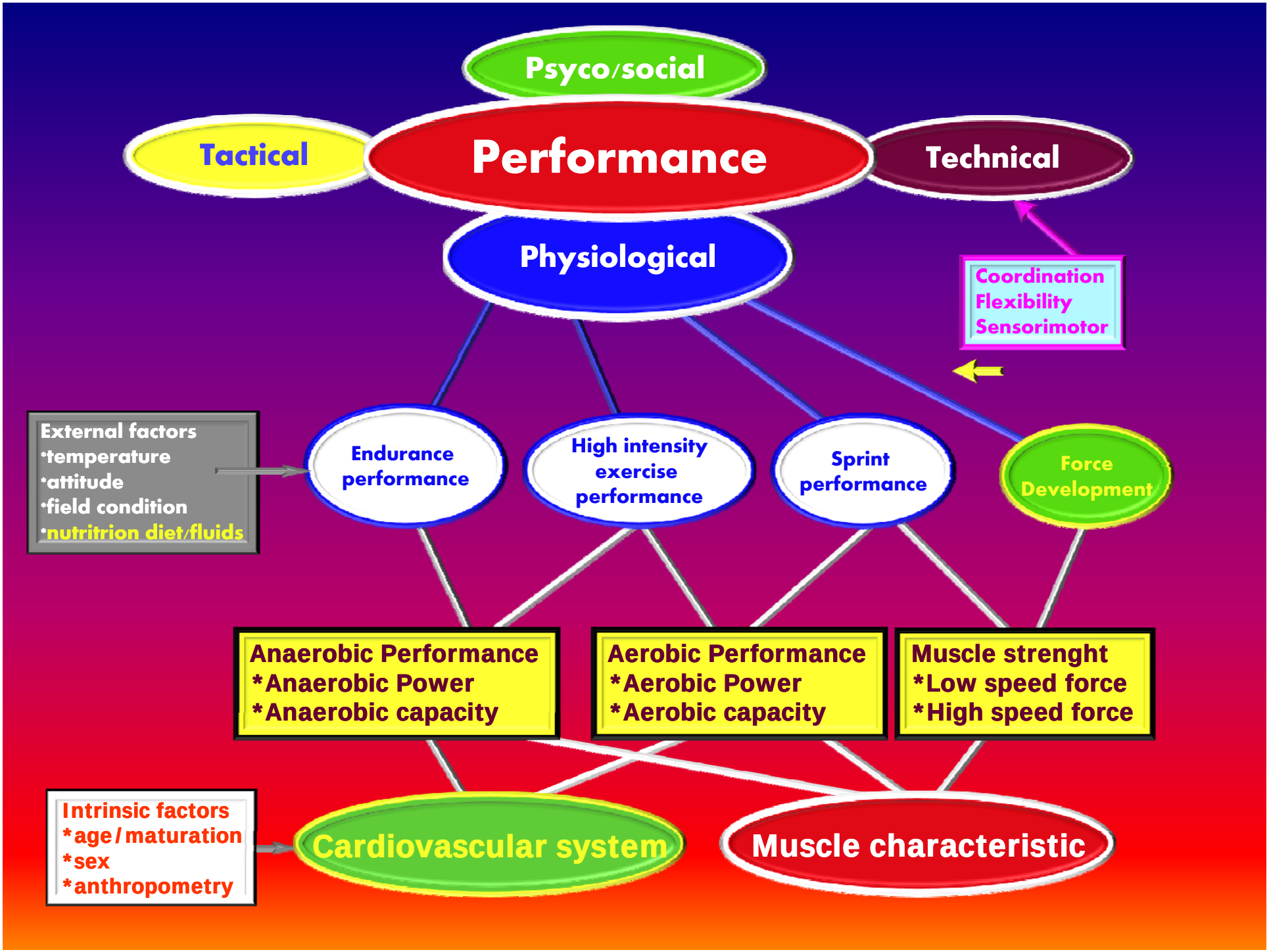
L.Cortain et al Int J Sport Med 1998

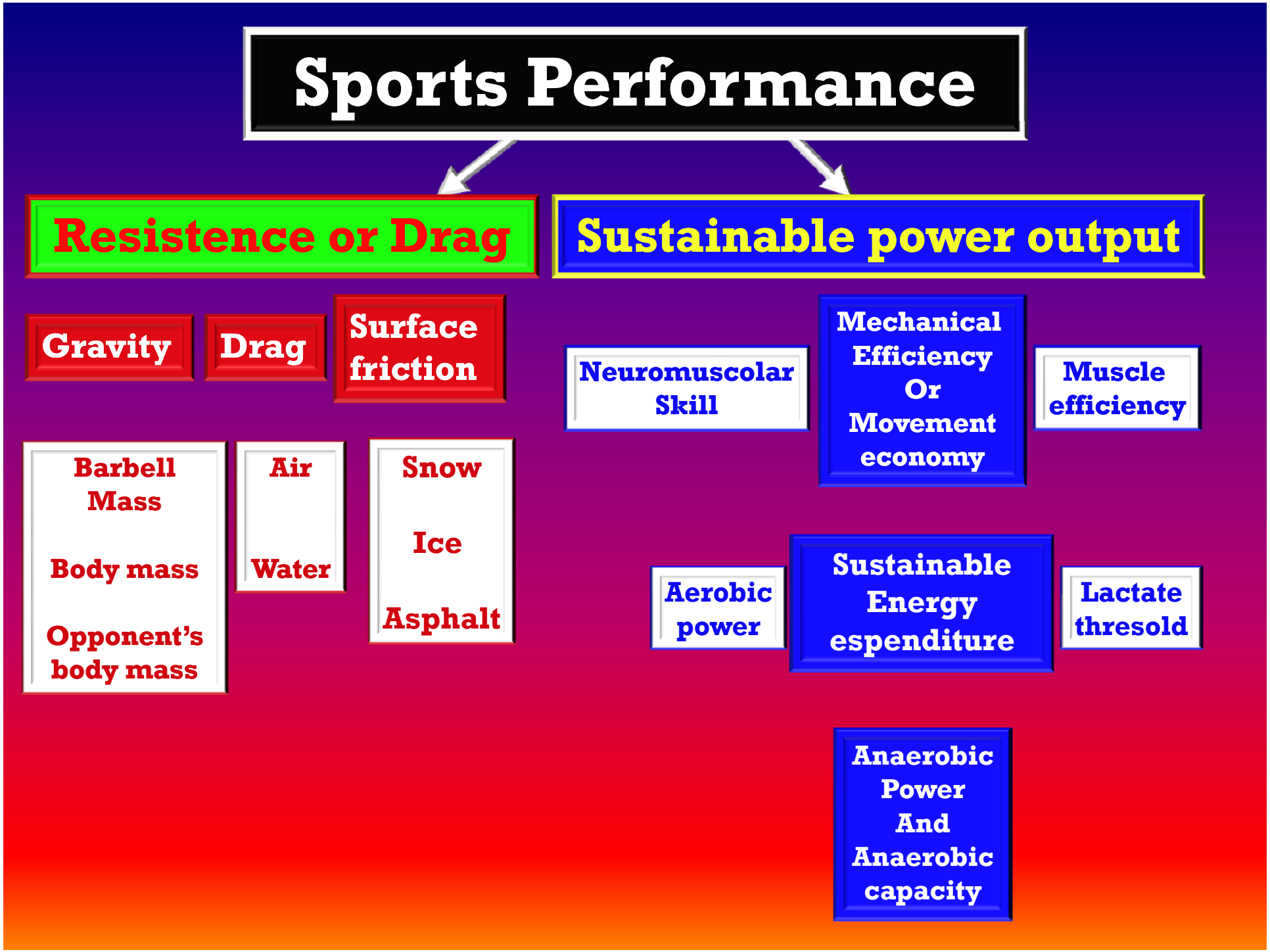

DYOTA


T··Home


ITALIA


Condizione atletica
Performance
Tattici
Tecnici
Psico/sociali


Psyco/social
Tactical
Performance
Technical
Physiological
Coordination
Flexibility
Sensorimotor
External factors
*temperature
*attitude
*field condition
*nutritrion diet/fluids
Endurance performance
High intensity exercise performance
Sprint performance
Force Development
Anaerobic Performance
*Anaerobic Power
*Anaerobic capacity
Aerobic Performance
*Aerobic Power
*Aerobic capacity
Muscle strenght
*Low speed force
*High speed force
Intrinsic factors
*age / maturation
*sex
*anthropometry
Cardiovascular system
Muscle characteristic


Sports Performance
Resistence or Drag
Sustainable power output
Gravity
Drag
Surface friction
Barbell Mass
Body mass
Opponent's body mass
Air
Water
Snow
Ice
Asphalt
Neuromuscolar Skill
Mechanical Efficiency Or Movement economy
Muscle efficiency
Aerobic power
Sustainable Energy espenditure
Lactate thresold
Anaerobic Power And Anaerobic capacity