Non-Communicable Diseases Watch
December 2015

Be Active to Reduce Cancer Risk

Key Points

※ Regular and adequate levels of physical activity have significant health benefits and contribute to the prevention of non-communicable diseases, including some cancers.

※ There are plausible biological mechanisms for the protective effect of physical activity against cancer. Physical activity may also protect against cancer directly or indirectly by reducing adiposity. By increasing gut motility, physical activity can reduce colon cancer risk.

※ To date, the evidence for reduced risk with increased physical activity is classified as convincing for colon cancer, probable for breast cancer (postmenopausal) and endometrial cancer.

※ Generally speaking, all types (activities undertaken while working, carrying out household chores, travelling, playing and engaging in recreational pursuits) and levels (light, moderate and vigorous) of physical activity can help protect against cancer risk.

※ Individuals are urged to limit the time spent on sitting, do as much light physical activity as possible in everyday life, and accumulate sufficient amounts of aerobic moderate- to vigorous-intensity physical activity throughout the week.

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Be Active to Reduce Cancer Risk

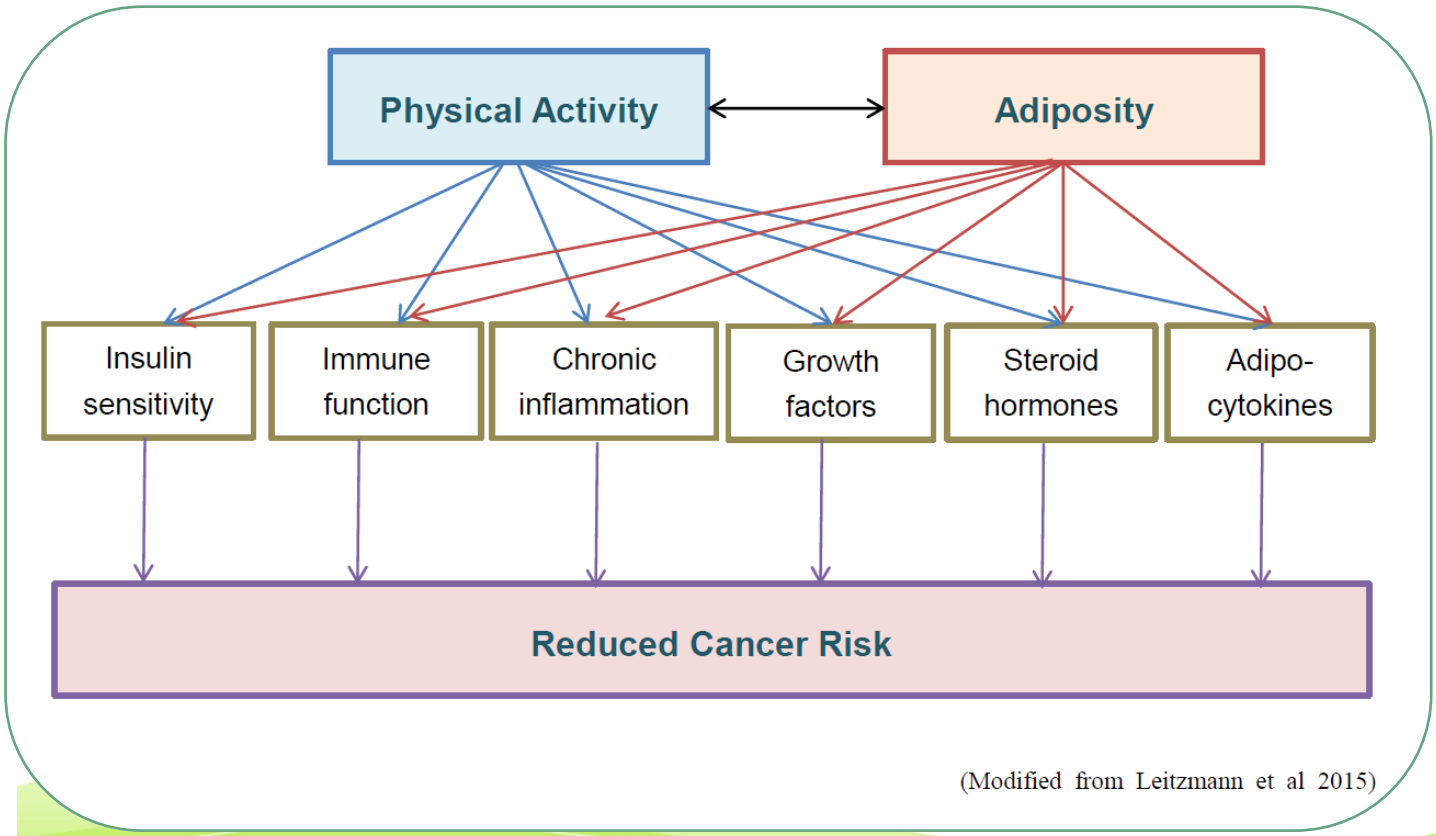
Physical activity is defined as any bodily movements produced by skeletal muscles that require energy expenditure, including activities undertaken while working, carrying out household chores, travelling, playing and engaging in recreational pursuits. At any age, regular and adequate levels of physical activity have significant health benefits and contribute to the prevention of non-communicable diseases, including some cancers. However, the World Health Organization (WHO) estimates that 1 in 4 adults worldwide is not active enough.[1] In Hong Kong, over three-fifths of community-dwelling adults aged 18 to 64 did not have adequate levels of physical activity.[2]

Plausible Biological Mechanisms of Physical Activity on Cancer Prevention

Depending on the type of cancer and stage of development, there are a number of plausible biological mechanisms by which physical activity may protect against cancer growth. They include enhanced insulin sensitivity and improvement in immunity function, as well as modulation of inflammatory markers, growth factors, steroid hormones and adipocytokines. Physical activity may also affect these pathways directly or indirectly by reducing adiposity (Figure 1).[3-6]

Taking colon cancer as an example, physical activity increases insulin sensitivity, improves immune functions (e.g. increases the number and activity of natural killer cells), lessens chronic inflammation and hence may reduce the risk of colon carcinogensis.[5] Besides, physical activity increases gut motility and decreases bowel transit time, thereby reducing colon cancer risk by lowering the exposure of colon mucosa to faecal carcinogens.[3]

Figure 1: Plausible biological mechanisms of physical activity on cancer prevention



(Modified from Leitzmann et al 2015)

Epidemiological Evidence on Physical Activity and Cancer Prevention

The scientific base for an important role of physical activity as a means of cancer prevention is rapidly accumulating. Despite the large number of studies conducted on physical activity and cancer, the lack of consistency in the methods used to quantify physical activity limits in-depth data analysis, and this has also precluded dose-response meta-analyses for some cancers.[5] As assessed and judged by the World Cancer Research Fund and American Institute of Cancer Research, Table 1 presents an overview of the grading of epidemiological evidence on physical activity and cancer risk reduction.[7-14]

Table 1: Grading of epidemiological evidence on physical activity and cancer risk reduction

Grading of epidemiological evidence	Cancer site
Convincing (with strong evidence to support a causal relationship)	• Colon
Probable (with substantial evidence to support a probable causal relationship)	• Breast (Postmenopausal) • Endometrium
Limited – suggestive (with evidence suggestive of a direction of effect)	• Breast (Premenopausal) • Lung • Pancreas • Liver
Limited – no conclusion (with so limited evidence that no firm conclusion can be made)	• Kidney • Bladder • Prostate • Ovary

Colon cancer

To date, the most convincing evidence for a protective effect of physical activity exists for colon cancer.[9] Compared with the least physically active people, a meta-analysis of 52 epidemiological studies reported that the most physically active people had an overall 24% reduced risk of colon cancer.[15] By anatomical subsites, studies reported that there were 24% to 27% reduced risk of proximal colon cancer and 23% to 26% reduced risk of distal colon cancer.[16, 17] However, no conclusion was drawn for rectal cancer.[9]

Breast cancer

There is substantial evidence showing that higher level of physical activity probably protects against postmenopausal breast cancer. For premenopausal breast cancer, data from cohort studies were inconsistent although most case-control studies showed evidence of risk reduction by physical activity.[8] A meta-analysis of 31 prospective studies found the most physically active women had an overall 12% reduced risk of breast cancer compared with the least physically active women. Dose-response analysis of data from 8 studies found that breast cancer risk decreased by 5% for every 2 hours per week increment in moderate- plus vigorous-intensity recreational activities.[18]

Endometrial cancer

There is generally consistent evidence showing a lower risk of endometrial cancer with higher level of physical activity.[11] Compared with women in the low physical activity category, meta-analysis of 33 cohort and case-control studies observed that women in the high physical activity category had 20% reduction in endometrial cancer risk. Reductions in endometrial cancer risk were observed for a broad range of physical activity domains (including recreational activity, occupational activity, walking or biking for transportation) as well as for different intensities (including light, moderate to vigorous, and vigorous).[19]

Cancers of other sites

By comparison, the evidence for physical activity in reducing the risk of lung cancer, pancreatic cancer and liver cancer are limited.[4, 5] As compared with low level of physical activity, a meta-analysis of 14 prospective studies suggested 23% and 13% reduced risk of lung cancer with high and medium levels of physical activity respectively.[20] Pooled estimates from 20 cohort and 6 case-control studies suggested a 11% reduction in pancreatic cancer among people in the highest leisure-time physical activity category compared with those in the lowest leisure-time physical activity category.[21] Another large cohort study with over 500 000 adults observed a significant 44% decreased risk of liver cancer among those who engaged in vigorous physical activity five times or more per week when comparing with those who had no activity.[22] Although systematic reviews and meta-analyses also implicated an inverse relationship between physical activity and cancer risk of oesophagus, stomach, kidney, bladder, prostate or ovary[23-27], more evidence would be needed to conclude a protective effect.

Recommendations on Physical Activity for Cancer Prevention

Given the biological plausibility through which physical activity may elevate levels of various anti-cancer defenses and the strength of risk reductions seen for many common cancers, the potential for leading an active lifestyle in primary cancer prevention is significant. For example, the World Cancer Research Fund International estimates that physical activity may prevent 15% of colorectal cancer, 17% of postmenopausal breast cancer and 18% of endometrial cancer in the United States (Table 2).[28]

Table 2: Preventability estimates* for physical activity on cancers of the colorectum, breast and endometrium in four countries

Cancer type	United States	United Kingdom	Brazil	China
Colorectal cancer	15%	12%	15%	7%
Postmenopausal breast cancer	17%	12%	11%	8%
Endometrial cancer	18%	10%	11%	5%

Note: *Proportion of each cancer that could be prevented in the total population.
Source: World Cancer Research Fund International, 2015.

While it is less clear about the domain (i.e. recreational, occupational, transportation or household), dose (including frequency, intensity or duration) and timing in life (such as during adolescence, young- or mid-adulthood) of physical activity being most preventive against cancer of particular sites,[3, 5] it is generally agreed that ALL types and levels of physical activity can help reduce cancer risk.[7, 29] Apart from limiting the time spent on sitting and doing as much light physical activity (e.g. walking, standing and stretching) as possible in everyday life (Box 1), adults are urged to engage in at least 150 minutes of aerobic moderate-intensity physical activity (e.g. brisk walking, yoga, swimming or cycling leisurely), or 75 minutes of aerobic vigorous-intensity physical activity (e.g. jogging, aerobic dance, fast swimming or cycling), or equivalent amounts throughout the week. For children and adolescents, they are advised to accumulate at least 60 minutes of aerobic moderate- to vigorous-intensity physical activity per day for optimal health and development.[29, 30]

To know more about the health benefits of physical activity or some common barriers for being active and ways to overcome these barriers, please visit the Department of Health's Change for Health website at http://ww.change4health.gov.hk/. Besides, the FAMILY Project, School of Public Health of The University of Hong Kong has produced a series of Zero-time Exercise videos. All the exercise are 3E (Enjoyable, Easy and Effective) and suitable for all family members to do together. Public can view the videos at the FAMILY Project's website http://www.family.org.hk/lang/en-us/zero-time-exercise-videos.html.

Box 1: Some tips for being more physically active

- ✓ Alight from transportation in advance and walk to destination
- ✓ Use the stairs instead of lifts or escalators
- ✓ Stand up or walk on the spot while talking on the phone; hand-deliver messages to colleagues rather than use the phone or emails if possible
- ✓ Use 10 to 15 minutes of the lunch-time for a brisk walk, or do some light stretching exercises for relaxation after lunch
- ✓ Have a walk with family or friends after dinner
- ✓ Engage in some physical activities while watching television, such as riding a stationary bike, using a stepping device or doing some stretching exercises
- ✓ Stand up while folding laundry, ironing or performing other sit-down household tasks
- ✓ Shift positions in the seat, and do leg lift or ankle rotation exercises regularly while sitting

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Hong Kong Cancer Day 2015

The Hong Kong Cancer Day will be held on 13 December 2015 at the Piazza of Kowloon Park. Organised by the Hong Kong Anti-Cancer Society, it is also coorganised and supported by over 50 organisations including the Department of Health. With the theme "***Together, We Prevent Cancer***", the event aims to raise public awareness of the fight against cancer through prevention, early detection, quality treatment, rehabilitation and holistic support to cancer patients and their families. There will be a series of exciting activities including games, talks, talent shows, etc.

Captain AC, along with all Health League members, will be there to play hide-and-seek with you. Are you ready for the challenge ? Come looking for them one by one and win prizes ! Remember to check for updates on the Healthy League Facebook Fan Page at https://www.facebook.com/HealthyLeague/.

Non-Communicable Diseases (NCD) WATCH *is dedicated to promote public's awareness of and disseminate health information about non-communicable diseases and related issues, and the importance of their prevention and control. It is also an indication of our commitments in responsive risk communication and to address the growing non-communicable disease threats to the health of our community. The Editorial Board welcomes your views and comments. Please send all comments and/or questions to so_dp3@dh.gov.hk.*