

social engagement.<sup>9</sup> This will not be simply a matter of income, although income is one way of measuring position in the hierarchy.<sup>10</sup>

Linking inequality in society with loss of dignity in individuals who are disadvantaged means that our set of social arrangements are crucial. By holding society responsible for human ills, including loss of dignity, are we not abrogating personal responsibility?<sup>11</sup> The answer is no. And is not being responsible for one's own life fundamental to one's own dignity? Taking personal responsibility for one's life is fundamental to human dignity—it is exercising autonomy and control. But society can determine the extent to which individuals are offered that opportunity. Greater inequality in society is likely to mean deprivation of education and other fundamentals that lead to health and autonomy. Without these, the individual cannot function fully in society. He is not put in a position where he can take responsibility for what happens to him. He is, in other words, deprived of human dignity. Dignity can be an attitude of mind that should dictate how we treat individuals. This attitude of mind should affect our social policy arrangements.

*Michael Marmot*

International Centre for Health and Society, University College London, Department of Epidemiology and Public Health, London WC1E 6BT, UK  
m.marmot@ucl.ac.uk

I declare that I have no conflict of interest.

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## Green tea: prevention and treatment of cancer by nutraceuticals

Green tea<sup>1</sup> has always been considered by the Chinese and Japanese peoples as a potent medicine for the maintenance of health, endowed with the power to prolong life. Recently, Yean Lee and colleagues<sup>2</sup> looked at the effects of the main active green tea constituent, epigallocatechin-3-gallate (EGCG) on chronic lymphocytic leukaemia B cells isolated from leukaemic patients. These cells are characterised by their resistance to apoptosis because they secrete and bind vascular endothelial growth factor (VEGF), a potent angiogenic cytokine that also acts as a crucial survival factor for tumour cells. The researchers showed that addition of EGCG to these cells markedly decreased VEGF-receptor phosphorylation, leading to the disruption of the VEGF-dependent autocrine pathway that protects the cells from apoptosis and cell death.

These results support our observations<sup>3</sup> on the potent inhibition of the activity of VEGF-receptor tyrosine kinase by components of green tea, and provide strong evidence that this inhibitory effect may have profound repercussions on tumours that depend on this cytokine for progression. Of considerable importance is the low concentration of EGCG required to trigger the observed biological effects, because VEGF-receptor activity can be inhibited<sup>3</sup> and apoptosis of leukaemia B cells can be induced<sup>2</sup> with concentrations of EGCG in the plasma after moderate drinking of green tea (2–4 cups a day).<sup>4</sup> Although more

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extensive investigation on the effects of this compound in patients with chronic lymphocytic leukaemia B is required, these findings nevertheless raise the interesting possibility that green tea could be used as a combination agent for treating leukaemia.

VEGF is also crucially important to tumour angiogenesis, the process by which tumours grow and invade surrounding host tissues.<sup>5</sup> In the initial phases of tumour growth, angiogenesis is highly sensitive to VEGF-receptor blockade.<sup>6</sup> Inhibition of VEGF-mediated signalling and subsequent angiogenesis by low-dose delivery of EGCG, as seen *in vitro*,<sup>3,7</sup> could thus have beneficial *in-vivo* effects against several other types of cancer. This mechanism also provides a strong scientific basis for the chemopreventive property of green tea that has been inferred from several epidemiological studies which showed that frequent drinking of green tea is inversely associated with the risk of developing several types of human cancer, such as oesophageal cancer.<sup>8</sup>

With the notable exception of the use of retinoic acid for the treatment of promyelocytic leukaemia,<sup>9</sup> the importance of nutraceuticals in cancer prevention and treatment remains largely under-exploited despite increasing evidence showing that these molecules have chemopreventive and chemotherapeutic ability. Notwithstanding the considerable progress made in the design of novel anticancer drugs in recent years, one clear lesson from the past decades of research into cancer is that, although we can treat cancer and induce remission, survival rates have changed little in most cancers. Moreover, most anticancer drugs have several toxic side-effects that may produce a poor quality of life for patients and considerable cost in supportive care. Green tea and other diet-derived compounds, such as curcumin, phyto-oestrogens and carotenoids,<sup>10</sup> offer several advantages as anticancer products, because these compounds are non-toxic, produce few side-effects, are widely available, and are cheap. It would thus be interesting to examine the beneficial effects of including green tea in the diet of patients undergoing treatment for cancer as well

as in patients at high risk of recurrence, such as those in remission after treatment and those at risk for a second neoplasm.

We believe that anticancer agents designed by nature and used for several thousands of years with little toxicity may prove useful in treating and preventing cancer. Results such as those obtained by Lee and co-workers<sup>2</sup> show that food-derived chemicals constitute a complementary source of anticancer agents.

\*Richard Béliveau, Denis Gingras

Laboratoire de Médecine Moléculaire, Hôpital Ste-Justine-UQAM, Centre de Cancérologie Charles-Bruneau, Montréal, Quebec, Canada H3T 1C  
beliveau.richard@uqam.ca

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## Centromere identity originates in the structure of CENP-A/H4 tetramer itself: a mechanism for aneuploidy

Formation of nucleosomes containing centromere protein A (CENP-A) defines the active centromere and kinetochore. Ben Black and colleagues<sup>1</sup> have recently argued that centromere identity originates in the structure of CENP-A histone H4 heterotetramer itself, which is more compact and rigid than histone H3/H4 heterotetramer.

During cell division, each daughter cell inherits one copy of each chromosome. Defects in chromosome segregation result in chromosome gain or loss (aneuploidy).

Chromosome mis-segregation during meiosis is a leading cause of chromosomal abnormalities, such as Down's syndrome, in liveborn children. Mis-segregation of chromosomes in mitosis may also be the main cause of cancers in human beings.<sup>2,3</sup> A critical event that ensures equal partitioning of the chromosomes is the proper separation of sister chromatids that are attached to the mitotic spindle. This attachment occurs at proteinaceous structures called kinetochores, which assemble on centromeric DNA. Thus