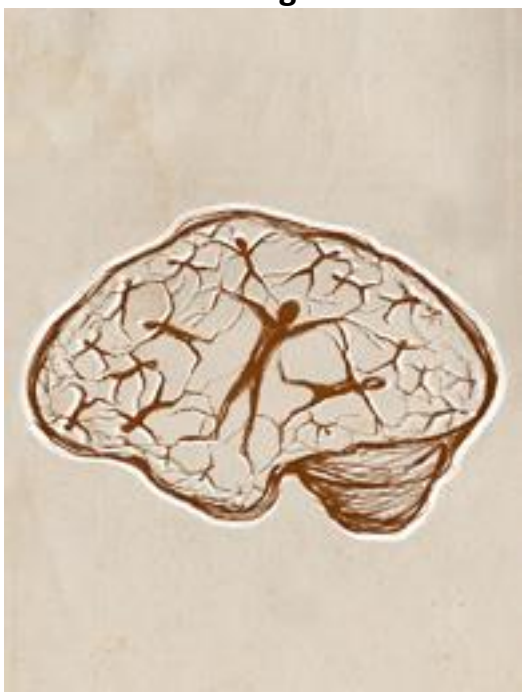
Translation by Patrizia Rustichelli-Stirgwolt

The review of the Italian association of psycho-neuro-endocrine-immunology
Edited by Francesco Bottaccioli

PNEI NEWS

The new knowledge of science and health



Nobody is healthy alone.

Neurosciences explain the social sources of health and disease.

Pnei News – bimonthly review – nr 1 – year IX – January – February 2015
PNEI NEWS NR 1 – JANUARY – FEBRUARY 2015

Translation by Patrizia Rustichelli-Stirgwolt

EDITORIAL

Cancer and "bad luck"

Francesco Bottaccioli – Master Director of "PNEI and Science of Integrative Care", University of Aquila

The article from C. Tomasetti and B. Vogelstein has generated much controversy since its publication on *Science*[1] on 2nd January 2015. Their paper in fact suggests that the majority of cancer occurs by chance, depending on random spontaneous genetic mutations arising during the normal stem cell divisions. The widespread debate arisen was amplified by the media coverage.

The reactions to this paper did not take long to appear. A first wave of responses was already published on the issue dated 13th February[2] of the same journal. They included statements from groups of scientists from MIT, International Agency for Research on Cancer (IARC), Harvard University and other prestigious institutions.

They all pointed to the limitations shown in the paper methodology as well as to the substantial incorrectness and danger implied in the conclusions published by the two researchers from the John Hopkins University.

None of these critiques were reported in the Italian media where the majority of the journalists depend on the press releases and are not used and often do not even have the competence to access directly to the sources of information.

The criticisms can be summarized as it follows: the paper did not include the most frequent cancers worldwide (breast, prostate, stomach, cervix, lymphoma) while it emphasized very rare cancers (e.g. osteosarcoma). Moreover the study focuses exclusively on the United States and did not consider the fact that cancer incidence differs among geographical areas and populations and, over time, within the same population. For example the incidence of oesophageal cancer rate is 100 times more among men from the Jiashan County in China and the Afro Americans in South Carolina than among men from Algeria who have the lowest incidence. In Japan the colorectal cancer was once rare but its incidence has increased 4-fold in just the last two decades most likely because of changes in the environment, the diet and lifestyle. In the same way the incidence of lung cancer attributed to cigarette smoking differs between genres where it drops in the males and increases in females.

The two biostatisticians from the John Hopkins University reply to the criticisms with mainly one argument: until now the study of cancer etiology has not taken into account the component related to the DNA replication of the stem cells and the inevitable genic replication errors. This is a true but also obvious statement: by increasing the number of cell divisions (and thus also the age of the tissues), it increases also the risk of errors, in fact the risk of cancer increases with the ageing of the population. It is the same as saying that by getting old it increases the risk of dying and cancer is the first in line among the several causes of death. Be aware that the proposed argument is not harmless: the conclusions drawn by C.Tomasetti and B.Vogelstein are indeed very dangerous as they imply that, due to the prevalence of the kind of cancer genesis, medicine and public policies should focus on early detection rather than on prevention. Thus not to take action to reduce risk agents such as environmental pollution or social factors such as nutrition,

stress, physical inactivity, but recurring to the mass screening to identify the tiniest cellular abnormality. The mass screening strategy[3] has by now proved to be harmful and ineffective. Primary prevention is the main path to follow as Angelo Levis, a respected Professor of environmental mutagenesis, reminds us in his article regarding the exposure to non-ionizing radiation produced by Wi-Fi networks. This issue calls the governments and the society to play their active role in prevention. As, the leader in social neurosciences, John Cacioppo, reminds us in his interview: nobody is healthy alone.

1. Tomasetti C., Vogelstein B (2015) Variation in cancer risk among tissues can be explained by the number of stem cell division, *Science* 347: 78-81
2. Sills J (ed) Letters, *Science* 347: 727-731
3. Ahn HS, Kim HJ, Welch HG. (2014). Korea's thyroid-cancer "epidemic"--screening and overdiagnosis. *N Engl J Med* 371(19):1765-7; see also: 2014 N Engl J Med 370;21 Bilder Adorno N., Juni P. (2014) Abolishing Mammography Screening Program? A View from the Swiss Medical Board *Pnei News* 3-4: 20-22