Gli scienziati dei principali paesi del mondo, riuniti dall'Accademia dei Lincei, hanno preparato, per il vertice G 7 dei Capi di Stato e di Governo, riuniti a maggio 2017 a Taormina, tre documenti con le raccomandazioni sui principali problemi del nostro Pianeta. Gli scienziati partecipanti, che rappresentavano 270 Accademie scientifiche appartenenti a 300 paesi di tutto il mondo, sono stati ricevuti al Quirinale dal Presidente della Repubblica Sergio Mattarella.

In uno dei documenti gli scienziati hanno lanciato un allarme sulla urgenza di affrontare l'epidemia di Alzheimer. "Nel mondo ci sono attualmente oltre 40 milioni di malati che - avvertono gli scienziati - diventeranno 135 milioni nel 2050". Il costo per l'assistenza aumenterà tra i 6 e gli 8 trilioni di dollari l'anno e il peso per le famiglie sarà devastante.

Nel comunicato stampa ufficiale si legge che "Le malattie neurodegenerative, quali il Parkinson, l'Alzheimer, la SLA e altre, si associano a disabilità motorie e/o cognitive del paziente che si aggrava progressivamente ed eventualmente necessita di assistenza totale e continuativa. Dato che l'insorgenza della malattia dipende dall'età e considerato che l'aspettativa di vita, già superiore agli 80 anni, tenderà ad aumentare, si prevede un cospicuo aumento delle malattie neurodegenerative. Attualmente nel mondo i malati di Alzheimer sono 40 milioni, ma aumenteranno a 135 milioni nel 2050. Poiché al momento non è noto un farmaco specifico ed efficace che consenta di rallentare, bloccare o invertire il decorso della malattia, il costo per l'assistenza aumenterebbe tra   i 6 e glo 8 parecchi trilioni di dollari all'anno; e il peso per le famiglie sarà devastante. Il documento indica la via maestra da seguire per tentare di arrivare alla scoperta di una cura specifica, incentivando risolutamente la ricerca fondamentale nel campo che ha aperto alcune prospettive promettenti; e sollecita una decisione politica risoluta e globale per prevenire uno tsunami neurologico".

Si riporta di seguito il testo integrale del documento

Final text of the joint statement (24 March 2017)

The challenge of neurodegenerative diseases in an aging population

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Demographic and socio-economic scenario

World population growth has been accompanied by a progressive increase in the number of older people. Government-supported medical research and scientific discoveries as well as improved education and living conditions have greatly reduced the chances of pandemics caused by infectious pathogens. In developed countries, life expectancy is now rising well above 80 years. Although in older people the prevailing causes of death are still cardiovascular diseases and cancer, Alzheimer's and Parkinson's diseases, Amyotrophic Lateral Sclerosis and other neurodegenerative disorders that are known to be strongly age-related are among the top ten illnesses ending with death that cannot yet be cured or slowed significantly.

The increase in the frequency of disabling, currently incurable neurodegenerative disorders is likely to have a devastating impact on individuals, families and societies, unless effective means to reduce the incidence and progression of these diseases are discovered. Alzheimer's disease alone will affect between one-third and one-half of people above 85 years of age; thus the number of people affected, estimated at 40 million worldwide in 2015, is anticipated to increase to 135 million by 2050 (e.g. 1; 2). As life expectancy in developed countries increases, the individual, social and financial burden of assisting these disabled patients surely will grow. In 2050 the economic toll is expected to rise to about one trillion US$ per year in the USA alone (e.g. 1). Moreover, in low- and middle-income countries the number of afflicted persons will increase in parallel with life expectancy, with serious negative impacts on their economies unless affordable healthcare and treatments become available.

These diseases currently have _no cure but only care._ Specific and effective treatments for them are urgently needed. Because of the heavy personal and economic impact of neurodegenerative diseases, and since pharmaceutical companies are unlikely to invest in the kind of fundamental research necessary to crack the problem, a significant expansion of public funding is vital to sustain a worldwide effort against the growing burden of these brain diseases. Based on recent progress, a global effort may have a realistic chance to address the problem effectively. Now is the time for political action given that the unrestrained aging of the population forebodes a depressing future for the next generations.

Scientific outlook

Neurodegenerative diseases are variable, with symptoms ranging from progressive dysfunction of motor control to mood disorders and cognitive deficits eventually expressed as full-blown dementia. When cognitive problems first begin and before they are sufficiently severe to impair markedly a subject's ability to carry out daily activities, the pathology results in mild cognitive impairment that may progress to a full-fledged

dementia. With time, disabilities impair normal, autonomous life, and eventually these patients require total assistance.

Today the primary goal is understanding the causes, mechanisms and progression of these disabling diseases. In spite of the evident clinical differences among them, neurodegenerative diseases have some fundamental commonalities. Pathology studies have revealed that the brain, spinal cord or peripheral nervous tissue harbor a number of abnormal nerve cells containing aggregates of damaged proteins that are characteristic of each clinical disorder.

Vascular and inflammatory processes contribute to the progression of many neurodegenerative diseases. Nevertheless, the discovery that protein damage is likely to be a unifying molecular mechanism shared by different neurodegenerative diseases has been an important step forward. A sensible strategy is to discover methods and drugs that either prevent or interfere with the formation and accumulation of these damaged proteins. Further research aimed at understanding the underlying molecular and cellular bases of these diseases would offer great hope for the future.

Challenges and strategies

Important research initiatives are underway (e.g. 3), but the magnitude of this problem calls for much broader efforts as no effective and specific cure is currently available. Medical care and social assistance for afflicted patients and their families are essential, and some successes in terms of caring and improvements in quality of life have been achieved, even though such services are often overburdened. Moreover, education, diet, physical exercise, cognitive stimulation, and treatment of diabetes, hypertension, obesity, might improve cognitive status. These effects, however, are small (e.g. 4) and have to be confirmed, which calls for well-controlled, large and randomized clinical trials.

In order to identify molecular targets for novel therapeutic interventions, the underlying physiological and molecular mechanisms leading to neurodegenerative disorders must be unveiled through innovative basic research. A rational strategy to address the problem of these neurodegenerative diseases demands an aggressive international initiative aimed at *(i)* recruiting talented and committed scientists to study in depth the mechanisms implicated in the onset of the neurodegenerative process and *(ii)* working toward minimizing the crisis by accelerating properly designed and conducted clinical studies. Based on the example of previously successful initiatives to combat cancer and AIDS, responsible policy makers should declare their equally strong commitment to support and encourage a concerted programme to combat and minimize this looming neurological disaster.

A delay in the onset of dementia by just five years would reduce the burden of Alzheimer's disease by 50%. Such a limited delay would be beneficial, yielding improved autonomy of the patient and relief to the commitment of the family and the public health bill.

Large-scale public funding for fundamental research is urgently needed to sustain a worldwide effort against this neurological challenge, in partnership with industry. The time for a political decision is now, given that population aging is proceeding rapidly and, with it, a predicted increase in neurodegenerative disorders.

High-priority actions to be considered:

- Encourage and support new research directions toward the goals of clarifying the different categories of neurodegenerative diseases, of identifying new markers that

predict neural degeneration, and of finding new targets for development of novel therapies to prevent or cure these diseases;

- Uncover the molecular, genetic and cellular commonalities of neurodegenerative disorders and develop new and valid cellular and animal models specific for the different diseases;

- Improve clinical trials and cognitive tests and make them more accessible, in order to significantly advance early diagnosis and enroll more people in both prevention and treatment;

- Design and implement better programs that integrate medical care with social and technological services, taking into account the challenges for caregivers.

Academies may play an important role in supporting all of the above recommendations by promoting the importance of peer-reviewed science in the field; by developing prediction and prevention activities; by providing a continuous forum to discuss scientific progress; and by providing multidisciplinary advice to governments, agencies and scientific institutions.

1. Alzheimer's Association (2015), *Alzheimer's disease facts and figures*, Alzheimers dement. 11, 332-384.
2. Dobson, C. M. (2017), *The amyloid phenomenon and its links with human disease*, Cold Spring Harbor Lab Press, 1-14.
3. http://www.neurodegenerationresearch.eu
4. Ngandu, T. *et al.* (2015), *A 2 year multidomain intervention of diet, exercise, cognitive training, and vascular risk, monitoring versus control to prevent cognitive decline in at-risk elderly people (FINGER): a randomised controlled trial*, Lancet 385, 2255-2263.