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Editorial

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From Epigenetics to Public Policy: A New Perspective for Early Action

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Epigenetic has been a trendy topic for scientific community in the last two decades at least, yet many people around the world including policy makers and stake holders still think this field has nothing to do with policies or politics. Epigenetics is known as the key regulation of genes expression without changes in deoxirebonucleic acid (DNA) sequence, and the classic epigenetic mechanisms such as DNA methylation or post-translational modifications of histones are the ones most commonly discussed and have been joined by recent biomolecular research by which genes expression might vary according to the ribonucleic acid (RNA) function. Existing literature supports that epigenetics changes are responses to environmental stimulus and exposures; mainly maternal exposures including inadequate nutrition.[1] In addition, it is now suggested the existence of epigenetic windows of susceptibility to environmental insults during sperm development, giving the chance for inclusion of both factors; maternal and paternal in research to promote better understanding of these effects on the health of future generations; and explore the relevant applications on the public policies related for taking early action on the prevention of many diseases.[2]

The last paragraph definitely might sound complicate to a lawyer or a political science specialist or to an economist, still, chances are these professionals are the ones who hold positions of making decisions to take public actions in the path of prevention of chronic diseases. Interaction, understanding and integration between the epigenetic terminology such as DNA methylation and policy analysis terminology such as end type problem, policy problems, problem structuring, preferred policies, observed policy outcomes and expected policy outcomes[3] should be approached as an everyday issue when considering the relevance of the problems itself.

Obesity, type 2 diabetes and other chronic diseases are major health concerns in today's world, so are social inequities that take the global population to harmful exposures in toxic or dangerous environments.[4] Smoking or second hand smoking, inadequate housing, poor water conditions, lack of access to health care services, lack of physical activity due to insecure neighborhoods, inadequate or excessive nutrients intake, excessive weight gain during pregnancies, lack of sleep are some of life conditions to which a large amount of population is exposed.[5] All these conditions when influencing the first thousand days of life might induce alterations in the genes expression without changing the DNA sequence, but definitely deteriorating future health of those exposed.[6]

Having said the above thoughts, we can now see how are the conditions of let's say, an adolescent mother in Caracas, Venezuela, where according to the Venezuelan Health Ministry and the United Nations division for population, 35 of 100 non planned pregnancies occurred in adolescents less than 18 years old in 2010. Living in poor conditions, without access to health services, unemployed and with interrupted education, she can give birth a child who starts life in poor conditions.[7] With no income for buying adequate foods, living in an insecure environment that does not allow her to walk what she needs to in order to achieve the 150 minutes recommended by the World Health Organization (WHO),[8] she might well become overweight or obese or undernourished and have inadequate weight gain during her pregnancy, therefore

establishing a metabolic scenario that will increase the odds for a future development of cardiovascular diseases, type 2 diabetes or obesity in her child.[5] The elevated economic, familiar and ultimately emotional cost of the poor start to life are showing at the moment, that we shall take action for prevention[9] thus making urgent that a space for considering epigenetics into public action should be given, more over when we know epigenetic changes are reversible.[1]

Human development starts with individuals ameliorating their wellbeing. As Amartya Sen refers, the ones who make progress and development are individuals then transferring their wellbeing into societies.[10] A proposal made between academic sectors in Venezuela in 2002 included four policies starting with a family policy that would reinforce the role of the family in its primary care for health, food and nutrition and education, since parents are the first ones involved in feeding their children, ensure that pregnant women food intake is adequate and healthy, introduce children into the education system and should be aware of health control consultation. A structured and healthy family should be the base for human development.[11] Then, three policies: employment, housing and education for sharing and tolerance are needed. Parents need good work plans so they can have an employment that gives the resources for living a life with dignity in a house that is safe and has access to basic services such as adequate water and energy supply and is clean, then education for living into the societal environment expressing the freedoms and respecting limits so everyone can enjoy their space.[11]

Epigenetics and public policy? Yes. Are employment policies related to epigenetic? Yes. When people: fathers, mothers and home leaders have wages that allow them to buy healthy foods, policy makers and stake holders are promoting adequate nutrition on the mothers to be and also in children under their care in the years that are key to growth and development. Are housing policies related to epigenetic? Yes, a safe environment at home allows children to play, to have the adequate stimulus for their development, a house that gets safe water will reduce infectious diseases in children and the rest of the family and non-polluted space will diminish the risk for certain toxic diseases. Finally, education for sharing and tolerance will ensure the knowledge necessary, so the population will be aware of what is important to do for themselves and their children, they will learn how to cooperate with others and understand the role of the family in the improvement of wellbeing. At the end what is interesting is that with the improvement of education, family employment and infrastructure, we are ensuring less methylation of DNA or post-translational modification of histones.

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