Epigenetics – medical , nutritional, social, legal and ethical consequences

A prerequisite for the formation of a multicellular higher organism built up of specialized cells is that some genes must be expressed while others should be inactive. The molecular mechanisms behind this division of labour is not fully known in all its details but involves methylation of cytosine bases on the genomic DNA as well as methylation, actylation and other chemical modifications of histone tails of the nucleosomes which play an important role in the compactation of nuclear DNA. The mechanisms that control gene activity in an complex organism and under its development are commonly referred to as epigenetics.

Experimental evidence accumulated over the last decade or so has made it obvious that the epigenetic pattern of the genome in higher organisms is dynamic and may be influenced by a number of factors – nutrition and diet, substances in the environment such as toxic chemicals, airborne pollutants, pesticides and other harmful substances, psychosocial factors, diseases affecting the organism, certain drugs etc. Furthermore, epigenetic traits of an organism may be carried over to the offspring in at least three generations and possibly longer. The latter observation in combination with the mounting evidence that the epigenetic pattern of an individual will affect susceptibility towards a number of diseases – for example some forms of cancer – as well as mental health – for example behavioural disorders – suggested that a multidisciplinary study of epigenetics would be a good initial theme for the Pufendorf Institute. Obviously not only health issues should be studied but also environmental regulatory policies as well as ethical issues. The title of the initial theme became therefore: ”Epigenetics – medical , nutritional, social, legal and ethical consequences”.