Mankind adaptation and present human health

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The recent review article by Franchini and Mannucci [1] concerning the effects of the evolution of mankind on haemostatic balance through the observed increased prothrombotic risk among Caucasian populations compared to the Afro-Asiatic ones [2, 3] opens another window on the fascinating interaction between the adaptation of mankind and present human health (or modern diseases). It is already well known and quite convincing that some single mutations, such as, for example, the one for lactose tolerance, as well as those prothrombotic related to coagulation factor II and factor V, favouring atherosclerotic and thrombotic events as suggested by Franchini and Mannucci, developed in the millennia between the late Palaeolithic (about 30,000 years ago, the prothrombotic ones) and the early Neolithic (10,000–12,000 years ago, the lactose tolerance) Periods [2, 4].

Palaeoanthropological as well as Archaeological studies suggest that this was the period of the irreversible, and relatively fast, transition from foraging (the gathering and hunting behaviour) to farming (the agricultural and animal breeding one) with a wealth of new acquisitions that we can summarize as the beginning of the human social network, that have gradually and continuously evolved to the present time [5, 6].

These palaeo-neolithic single genetic mutations may well represent some of the possible markers of the last human genotype arrangements that have consequentially conditioned modern human behaviour and health. Prothrombotic mutations, as suggested by Franchini and Mannucci, have protected humans, while colonizing more inhospitable, in particular the cold northern European lands: respectively men from bleeding after major injuries and women from excessive menstrual bleeding, after parturition etc. On the other hand other single mutations, such as the one for lactose tolerance, have favoured survival in adulthood, making dairy products consumption possible etc. [4].

Nowadays, these “protective” adaptations, which occurred while moving from foraging to farming, may represent a detrimental human health risk after the definite global transition from nature to nurture (i.e. the natural environment transformed and conditioned by the excessive human presence) [7].

Nevertheless, besides these single gene mutations, the overall genetic background of our species, as determined in the Palaeolithic age, seems to be scarcely protective in this current environment as documented by the diffuse predisposing genotype for an increased energy efficiency or physical inactivity, facilitating the onset of Obesity, the Metabolic Syndrome and related chronic metabolic (diabetes, hyperlipidaemia, hypertension etc.), cardiovascular, and some neoplastic diseases. In these diseases the genetic polymorphisms are involved more than single genetic mutations, thus explaining, at least in part, the rapid epidemics of these chronic disorders in a facilitating environment as the one typical of these globalized societies [8–13].

Indeed, these single gene as well polygenic mutations usually become clinically relevant in late adulthood, i.e. after the reproductive age, thus spreading to future generations without any selective protective mechanism.
Taken together, all these observations suggest that the human genotype is rapidly becoming slightly but continuously less protective against chronic disabling diseases in a period of increased human life span.

The delicate physiological equilibrium regulating many functions such as haemostatic balance, energy balance etc., is nowadays under heavy environmental and biological pressure without an adequate genetic protection.

Careful attention to human behaviour and its environment seem to be of pivotal importance to guarantee today and in the future, satisfactory health standards of primary interest for any health policy.

References