

### Introduzione/*Introduction*

#### *The “MEG 2015” Conference main concept*

This special issue of the Journal *Medicina nei Secoli* contains, in two volumes, a selection of the papers presented at the International Conference “Medical Terminology and Epistemology (MEG) for a Lexicon of Genetics and its Degenerations from Hippocrates to ICD-10” held in Palermo (4-6 May 2015), a major output of the FIRB Project (Futuro in Ricerca, nr. RBFR10Q67A) co-funded by the Italian Ministry of Education, Research and University and by the Universities of Palermo and “Sapienza” in Rome.

According to the interdisciplinary approach of the FIRB Project, emphasizing the dialogue between ancient and modern medical discourses in order to investigate the most representative words and notions in the long history of Genetics, invited scholars from different scientific fields have gathered in Palermo to present to a wide audience their researches on diagnostic and therapeutic measures and the technologies of hereditary and congenital diseases in the ancient and modern history of medicine.

#### *The Conference Sessions*

The conference sessions, respectively devoted to the discussion of the topics “The Origins of Diseases”, “Words of Generation”, “Diagnosis: Signs and Proofs”, “Therapies and Technologies”, “Degeneration: Words and Concepts”, focused on illustrating the relationships between the keywords of medico-historical, epistemological and philosophical thought on hereditary and genetic diseases, as well as on their cultural, scientific and socio-political context. Each session was opened and closed by internationally renowned scholars invited as keynote speakers.

The conference was opened by the keynote speech by Jacques Jouanna titled “*Sexe, génération et maladie dans le traité hippocratique des Épidémies I et III*” (in French). The paper focuses on the specific style and medical terminology used in Books I/III of *Epidemics*, particularly in the context of women’s diseases, where specific attention is tributed by the ancient physician to the relation between the patient’s gender and the climatic nosological conditions (*katastàseis*) in which the female disorders occur. It is noteworthy that Jouanna, on the basis of his recent new critical edition (Paris 2016, Les Belles Lettres), claims that the two different *Epidemics*’-books are (part of) the original work of a single author not adequately recognized by ancient and modern scholarship.

Antonietta Provenza (whose research has been funded by the FIRB project) opened the first session on the topic “The Origins of Diseases” with a lecture on “*From Myth to Science. A Short Survey on Heredity and Its Causes in Ancient Greece*”. Her essay shed new light on the long historical process rooted in the mythological notion of guilt as the cause of contamination within the familial stock (*genos*), and later developed into the forms of Greek medical and philosophical thought in the 5<sup>th</sup>-4<sup>th</sup> centuries B.C., as expressed in the writings of the Hippocratic, Aristotelian and Galenic collections as well as in other literary sources, such as Herodotus’ *Histories*. In these sources, the causal explanation of hereditary diseases becomes more and more rational, based upon visible signs and shared theories on generation and transmission of hereditary characteristics.

Fabio Tutrone devotes his paper to the analysis of Lucretius’ treatment of (in)fertility in Book IV of *De rerum natura* (verses 1233-1247), whose complete understanding depends on the possibility of enlightening the social-cultural and religious context in which the poem was conceived. Against the superstitious ideas of the old Roman tradition concerning (in)fertility, Lucretius opposes the light of Epicurean philosophy, so that, like birth and death, fertility and infertility should not

be ascribed to the gods or luck, but to natural and physiological processes. According to the Epicurean standard idea of procreation (e.g. as expressed in the *PHerc.* 908/1390), Lucretius proposes an aetiology of infertility not merely based on the quantity of semen, but rather on its quality, which should be neither too thin nor too thick.

The paper by Giulia Frezza (a researcher funded by the FIRB Project) – “*The rise and the fall of the cause in aetiological models: influences, gene, environment*” – investigates the historical development of the concept of cause as the determinant of health and disease, focusing especially on the epistemological aspects of the matter. The major shifts in the notion of cause in generation and heredity theories are addressed, so that in Antiquity a sort of *coalescence* between *nature* and *nurture* is identified in the explanation of pathological events. After the positivistic turn in the middle of the 19<sup>th</sup> century, this coalescence is mirrored in the most recent aetiological models by the breakdown of the monolithic concept of cause and the focus on ‘*interacting*’ risk factors.

The paper by Pietro Giuffrida, Francesca Faillaci and Lucia Sideli investigates the question of whether and to what extent the Aristotelian use of the term *epigenesis* has influenced the modern notion and use of *epigenetics*. As shown, after the 16<sup>th</sup> century use of epigenesis to describe the Aristotelian perspective as opposed to preformationism, the concept has been re-elaborated by C.H. Waddington, eventually pointing at the newly coined “epigenetics”, that is, the investigation of the influence of environmental factors on genetics. Aristotle seldom used the term, and mostly in ethics and rhetoric rather than in natural history. However, a connection between the ancient term and its modern use is possible because of the relation, emphasized by Aristotle, between internal powers to change and external factors which stimulate a change.

The session was closed by the keynote speech by Claude Calame titled “*L’uomo e il suo ambiente nella Grecia antica: per una “ecopo-*

*iesi*” (translated from French into Italian). The presentation summarized a section of a larger book, highlighting the intimate coherence between the Greek concept of nature (*physis*) and that of culture. Moving from the etymological meaning of this term, interpreted as a process of growth and development beginning at the moment of human conception, the Greek concept of nature appears to be really different from the modern one: since Descartes and the Enlightenment, Nature has become subject to human reason, and even more so within neoliberal capitalism, which implies domination of nature and exploitation of so-called *human and natural resources*. From this eco-socialistic point of view, an anthropological perspective on the Greek concept of nature invites us to construct a new model of human ecological approach to Mother-Hearth.

The second session, “The Words of Generation”, was opened by the keynote lecture by Véronique Boudon-Millot, discussing the major theories on generation and reproduction from early Greek thought till Galen. Keywords in the ancient and modern genetics – like *genos* and *eidōs* are critically observed. Their use in authors such as Aristotle and Galen, especially in connection with the adjective *hòmoios*, ‘similar’, and the issue of the likeness between parents and their offspring, shows a central role for these concepts in the ancient discourse on heredity and transmission of moral, social and biological characters. In this frame, a short history of ancient theories on human reproduction and generation is sketched according to the most important ancient sources, i.e. Hippocratic medicine, Aristotle’s work and Galen’s major embryological and anatomical writings (*De semine*, *De usu partium*, as well as the pseudogalenic treatise *De theriaca ad Pisonem*, where the differences between the Galenic and the Epicurean theories of generation are discussed). The paper by Valentina Gazzaniga and Marco Cilione proposes a comparison between the higher juridical role of the patrilineal tran-

sfer of hereditary characteristics in Athenian society on the one side, according to the oldest embryological beliefs, and the value attributed in Sparta to the woman's role in the eugenic determination of the offspring on the other side. Under this perspective some specific keywords in ancient testimonies are discussed, like the terms εὐγενέτης/εὐγενέτις in its epigraphic and literary use, and the nouns τεκνοποιία and γένος. A particular attention is paid to those passages in the Greek literature (as happens in the Aeschylean *Eumenides* or in *Lycurgus' Life* by Plutarch or even in Plato's work) devoted to the discussion of the specific contribution of the two sexes to the generation and the transmission of hereditary traits.

The paper by Nesma Elsakaan and Michele Longo is focused on the interpretation of some Quranic verses from the 23<sup>rd</sup> *surah* dealing with human generation, and particularly offering a description of its early stages. A specific terminology is used for the three different steps of the embryological growth, each of them naming a thicker and more complex status of the embryo, from spermatic discharge (the *nutfah*), to the condition of coagulated blood (the *alaqah*), and finally to a more solid and recognizable form (named *mudghah*). The embryological theory expressed by the Quranic text reveals some significant similarities with the Hippocratic tradition, as it is expressed in the treatise *On generation/On nature of the child*.

The session was closed by the paper by María Teresa Santamaría Hernández, devoted to the description of the *Fundamenta medicorum*, the major work of the physician from Toledo Álvaro de Castro (15<sup>th</sup>-16<sup>th</sup> century), in the form of an alphabetically arranged dictionary, useful as an introduction to the medical knowledge of the time, with particular attention to the medical terminology used in the fields of heredity and generation. Interestingly, in this work the term for hereditary diseases '*hereditari morbi*' occurs, though its use is not attested in ancient Latin medical works, but it has existed in medical dictionaries and treatises since the 13<sup>th</sup> century.

At the beginning of the third session on the topic “Diagnosis: Signs and Proofs”, Salvatore Di Piazza (one of the researchers funded by the FIRB Project) presented the paper “*Diagnosis in Corpus Hippocraticum: (also) a question of trust*”. The essay investigates the role of trust (Greek *pistis*) in the diagnostic process, particularly in order to understand if there was a link between trust and the specific epistemological status of medical diagnosis. Operating within the limits of the so-called ‘*epistemology of fallibility*’, the Hippocratic physician tries to put order in a chaotic and complex world, that of the patient’s experience. The physician has to investigate an invisible world by means of the major tools of the trade, i.e. words and signs (*logoi/semēta*). According to these premises the diagnostic process is not an easy one, and consequently medicine will be defined in Aristotle’s words as an art progressing by means of conjectures and errors (*techne stochastikè*).

Giuseppe Di Cesare and Lucia Parlato discussed the fast-growing relevance of the DNA as evidence in the criminal law, in the Italian as well as the European legislation. A particular emphasis is placed on the modern debate on the search for a balance between individual rights and efficacy of criminal justice. In fact, the DNA as scientific proof is widely considered as crucial and highly reliable, and it has been used particularly to ask for the revision of a closed criminal case. However, its use raises several concerns, especially regarding privacy and the methods for DNA collection and sampling.

Problems about DNA and genetic diagnosis are also pointed at in the next paper by Mauro Capocci (principal researcher of the Rome unit within the FIRB Project) which closed the conference session. His paper mostly focuses on the novelties introduced by genetic and genomic technology as far as diagnosis is concerned, both in terms of creating a nosology and of identifying a pathology. The new technologies have the potential to change the diagnostic act, and to create new bio-social frames for individuals. However, large scale genomic

testing is still far from being clinically useful: the net result of the last two decades of genomic marketing to the public, is an increased focus on the life style of the patient, the *regimen*.

The fourth conference session devoted to the topic “Therapies and Technologies” was opened by Florence Bourbon talking about “*Predicting and choosing baby’s gender in the Hippocratic Corpus*”. The paper discusses the theories expounded in several Hippocratic treatises (among them *Epidemics*, *Aphorisms*, *Barren Women*, *Superfetation* and *Generation*). Beyond the diversity of approaches, there are, some common elements in the way of prediction and in the dietetic prescriptions to be taken into account. Whether the baby’s gender is attributed to the conditions of the uterus or to the prevalence of the male or female seed in the ejaculated sperm, it emerges that the efforts to understand the process of generation also seem to imply the possibility of controlling it.

The paper by Franco Giorgianni, Principal Investigator of the FIRB Project, titled “*Forms and limits of therapeutic treatments of hereditary diseases in ancient Greece*” shows how complex the issue of biological heredity was in ancient Greece. Not really distinguished from treatment of other diseases, therapy of diseases on hereditary basis seems to be a complex phenomenon for the Greek physician, including not only the knowledge of human nature (*physis*), but also a network of social, political and ideological factors. Inborn diseases were mostly treated via dietetic regimen, but also pharmacological treatment was available. Although a direct influence on the genetic level was very difficult for Greek thought, the paper points out that the Greek society aimed through medicine to mold the human being like a plant, and in this sense therapy proved to have a molding effect on human beings.

The session was concluded by Rossella Costa (a researcher funded by the FIRB Project) with the paper titled “*From chemical to genetic*”

*individuality. Evolving concepts and therapeutic approaches*". The centrality of Archibald Garrod's concept of *chemical individuality* is vindicated by this essay, describing its evolution in a *genetic* and finally in a *metabolic* perspective. The paper further points how the individualized approach based on genetics has been developed more and more, while metabolic diseases are now defined as '*complex*', because they are extremely variable from the genotypic and phenotypic point of view. In such a biomedical context, a general task of genetic studies is to find a way for a '*personalized medicine*'.

The last session, devoted to the topic "Degeneration: Words and Concept", was introduced by the keynote speech by Véronique Dasen, "*The construction of physical otherness in ancient iconography*", focused particularly on what in modern times has been defined as the '*social construction of disability*' in Antiquity. As a case study, the paper investigates the iconography of dwarfs. Beside the negative description given by Aristotle, and despite some opinions of modern scholars, mostly neglecting the iconographic sources, the iconography of dwarfs in the antiquity reveals an ambivalent status: because of their pathological short stature they are *different*, but at the same time with their comic behavior they are integrated into the *thiasos* of Dionysos, as showed by Attic vases, where they are represented as satyrs or in a sympotic context, put, so to speak, between the human and the divine world. Such a powerful multidisciplinary approach ultimately aims at the deconstruction of the modern social attitude towards physically disabled people.

Armelle Debru's paper deals with the history of the term *degeneration* in the framework of French medical lexicography in the 19<sup>th</sup> century, focusing on the attempt of the physician and lexicographer Emile Littré to limit the use of '*degeneration*' to the botanical and histological field. According to its Latin original meaning, i.e. '*to depart from the genos*', it qualified plants which lost their original character, and only later became a term with ethical value. Against



the attitude of his contemporaries, who extended the use of terms ‘*dégénération*’/‘*dégénérescence*’ to human pathological aspects, Littré, albeit without success, attempted in his *Dictionnaire de médecine* published in 1873 at separate those terms from the hereditary meaning of ‘*dégradation*’, which implies a difference in degree and not an alteration of the original nature.

As pointed out in the paper by Sabrina Grimaudo (a researcher involved in the FIRB Project) titled “*From Generation to Degeneration. The Health-Disease Link in Galen’s Corpus*” the concept of ‘*genetic diseases*’ is present in Galen’s works with a limited notion, and this is due first of all to the particular health and disease concepts Galen developed. After having taken into account the sporadic evidences existing in medical literature before Galen of theories on genetically founded types of diseases (with quotations from the Hippocratic corpus and Aristotle), the research shows how on one side Galen refers more commonly to diseases as congenital than as hereditary, and on the other side that a particular stress on the hereditary character of some diseases would have weakened the teleological perspective he assumes on the basis of Aristotelian thought.

Marzia Soardi’s essay examines the issue of the origins of malformations and anomalies in the framework of the Aristotelian theory of reproduction. The question is crucial for understanding how the teleological drive relates to the counterbalance of material necessity within Aristotelian conception of nature. The analysis mostly focus on the theories on the hereditary transmission of characters as expressed in Book IV of *Generation of Animals*. Here, the first form of genetic anomaly is the reproduction of a female, and so that the female is put on a par with other monstrosities and genetic malformations. However, in the context of the Aristotelian thought, deformities and monstrosities are not against, but in full accordance with nature.

The following paper by Elisabetta Sirgiovanni analyses contemporary findings in the biology of criminal and pathological behavior and

connects recent science with the approach put forward by Cesare Lombroso at the beginning of the XX century. Lombroso's theories about the '*born criminal*', though strongly biased and poorly founded for the lack of research, heralded a strong positivist approach. Lombroso's perspective has been somehow vindicated by recent research into the biological basis of criminal behavior, and the paper shows how these discoveries are making an impact on legal proceedings.

The session was closed by María Jesús Santesmases's paper, "*The super-female: women, gender and handbooks in the history of a genetic term*", describing the history of '*genderization*' of genetic studies of human chromosomes through the case study of the term '*super-female*' introduced in *Drosophila* research. The gender approach of the paper shows that the biological gender has always been a historically contingent and culturally grounded concept, with *Drosophila* handbooks acting as '*spaces of authority*'. The German geneticist Curt Stern reacted against the use of term *super-female* within human genetics, claiming that it was not entirely proved that a 3X-woman was, genetically speaking, more feminine than a 2X-woman, and proposing for this specific anomaly the new term '*metafemale*'.

The concluding remarks on the conference are by the keynote speaker Vivian Nutton, whom we thank for his short report on the principal outcomes of the MEG International Conference 2015. He emphasizes the relevance of the interdisciplinary effort upon which the FIRB Project and the International Conference held in Palermo were based. The comparison between ancient and modern theories on generation, reproduction and transmission of diseases on a hereditary basis has shown that some dilemmas did not yet find a definitive solution in contemporary science. Despite the medico-historical differences and the scientific gap, what is common to ancient and mo-

dern thought about genetics and the formation of the human being is the tendency of medicine to become more and more centred on the individual constitution of each patient.

The FIRB project, and especially the final meeting in Palermo, also proved that a dialogue between contemporary and ancient history is not only possible, but also fruitful. The historical perspective is made more powerful by the two different vantage points. The creation of a coherent narrative of the biomedical approach to the very historical nature of the human being, ultimately unites biological and historical heredity.

As editors of this special issue, we wish to thank all the authors of this collection of essays as well as all the speakers at the conference, for their stimulating contribution during and after the meeting. We also wish to thank Stefania Lenci from the editorial office of *Medicina nei Secoli*, for her invaluable work in support of this publication.

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