

# "You can't make a monkey out of us": Galen and genetics versus Darwin

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## Summary

The views on the biological relationship between human and ape are polarized. One end is summarized by the axiom that "man is the third chimpanzee", a thesis put forward in an indirect way initially by Charles Darwin in the 19<sup>th</sup> century. The other is a very modern concept that although similar, the human and ape genomes are distinctly different. We have compared these two views on the subject with the stance of the ancient medical writer Galen. There is a striking resemblance between current and ancient opinion on three key issues. Firstly, on the fact that man and apes are similar but not identical. Secondly, on the influence of such debates on fields much wider than biology. And finally, on the comparative usefulness of apes as a substitute for human anatomy and physiology studies.

## Resume

Les points de vue concernant les liens biologiques existants entre être humain et singe sont polarisés selon une seule direction. À l'extrême, on pourrait résumer ce point de vue par l'axiome selon lequel « l'homme est le troisième chimpanzé ». Cette thèse fut indirectement soutenue par Charles Darwin, au 19<sup>ème</sup> siècle. L'autre point de vue est un concept très moderne soutenant la similitude mais non l'identité entre les génomes de l'homme et du singe. Nous avons comparé ces deux points de vue sur le sujet en mentionnant celui du médecin écrivain Galien, dans l'Antiquité. Il existe une ressemblance frappante entre l'opinion courante et celle d'Antiquité sur ces trois questions clés. La première assertion soutient que l'homme et le singe, s'ils apparaissent similaires, ne sont nullement identiques. La seconde insiste sur l'influence que pourraient avoir de tels débats sur des champs plus larges que celui de la seule biologie. La dernière assertion a trait elle à l'utilité comparée des singes et de l'homme, les premiers constituant un substitut aux études d'anatomie et de physiologie humaines.

## Introduction

**"... Because imitating is inherent in humans from childhood and that is their difference, that they are most imitative..."**

Mimesis, imitation, has been a fundamental characteristic of human civilization as is evident from the extract of Aristotle cited above. The ability of apes to imitate has aroused human curiosity from time immemorial. Traditionally, the History of Medicine is thought of as the faculty that shows modern scientists, (in a somewhat exuberant way), the wise answers that scientists of the past have produced for various problems. We believe that the main contribution that History of Medicine offers to the evolution of scientific thinking is to reveal the questions our intellectual forbears posed and the insight with which they had tried to answer, albeit not always in a practical manner. This stands true for the field of bioethics<sup>2</sup> as well as for the field of genetics<sup>3</sup>. In this article, we discuss Galen's thesis on the question of the relationship between human and ape.

Ever since Darwin (1809-1882) put forward the theory that man is but an evolved ape, fierce debate has continued. We can summarize the relevant issues in three questions:

- Is it worth putting large efforts into examining how an animal has developed and what its connections with humans are?
- Is man really the modern ape or is he a different although similar species?
- Irrespective of the ape/human relationship, are there scientific advantages in using apes as experimental

animals in pursuit of knowledge of our own anatomy and physiology?

In the following paragraphs, we explain current opinions and Galen's views on these questions.

a) Every novel scientific discovery gives rise to numerous arguments between scholars of different disciplines. This was so when Galileo put forward his thesis on the motion of the earth, when Darwin published his theory of evolution and when Einstein published his theory of relativity. This happened because these theories go far beyond investigating natural or cosmological history, since all kinds of scholars, politicians, theologians and artists tend to interpret and exploit new knowledge according to their own beliefs and dogmatic stances. For, as Wes Bertrand stated in 2000 AD (Wes Bertrand. Cognition in primates. 2000, <http://www.logicalllearning.net/cogprimates.html>), there are three types of researchers who may do comparative studies between apes and humans: "Those who desire to confirm their hopes that chimps are in the same conceptual category as humans, those who are skeptical and seek to disprove any such notion and those who are simply on a quest of knowledge regardless of the consequences". Similarly, Galen (1<sup>st</sup>-2<sup>nd</sup> cent. AD), the famous doctor of the Greco-Roman period, stated: "Anatomical study has one application for the natural philosopher who loves knowledge for its own sake, another for him who values it only in order to demonstrate that nature does nothing in vain, a third for one who, via anatomy, provides himself with data for investigating a function, physical or mental, and yet another for the practitioner who has to remove splinters and

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*missiles efficiently, to exercise body-parts properly, or to treat ulcers, fistulae and abscesses*<sup>4</sup>

b) Although for the traditional adherents to Darwin's theory "Humans are the third chimpanzee"<sup>5</sup>, in a recent article<sup>6</sup>, Frazer and colleagues examined the genetic resemblance of man and non-human primate from a different point of view. Using state-of-the-art processing technologies, they managed to trace significant differences in the chromosomes of the two species. "[This study] provides a valuable starting point from which to improve our understanding of what makes human beings unique" said Dr. David Cox, Perlegen's chief scientific officer and co-author of the study. "These results suggest that genomic rearrangements are responsible for a significant fraction of DNA sequence differences between humans and chimpanzees, accounting for about 50% as much DNA variation as single nucleotide fixed differences [...] These arrangements provide excellent starting points for focused studies of gene expression differences in humans and chimpanzees as part of an effort to identify the genetic differences responsible for the biological, physiological and behavior differences between them". A reporter, commenting on the above findings concluded that: "You can't make a monkey out of us". For, as Wes Bertrand states: "In reading about the chimpanzees' mental feats, one gets the impression that **they view the whole process as a game**. Most of their behavior consisted of requests, not functionally different than a dog that barks to be let outside or playfully brings one a rope to play tug-of-war". Galen gave the "naturalists" of his era a surprisingly similar, almost verbatim, answer: "[...] And that a monkey is a laughable effigy of a human has been proven, and for that reason it walks like a man but hobbling, mainly because he lacks the upright limbs structure".<sup>7</sup> He continues: "[...] And if you have seen it didn't you notice at all how thin and short and totally ridiculous, just like the whole animal, the monkey, is? In the manner of someone reminding us of remote memories, the monkey is always capable of producing illusions for children as if it was true to the nature of a human, **because this animal is a ridiculous game for children to play**. For it tries to imitate all human actions, making mistakes that make it look ridiculous [...] and they [Galen's opponents who support a monkey's affinity with a human] make a great and fearful effort to show that [monkeys] either have a soul wiser than that of other animals or a body structure appropriate for a wise animal. Let us already abandon these [scientists]"<sup>8</sup>

In spite of the "abandonment of these scientists", the

notion that apes are but primitive anthropoids survived to the Middle Ages and beyond (fig. 1),

c) Despite their reservations, Frazer and colleagues suggested "So chimps are good for practising doctors and researchers". Galen's attitude was similar when stressing that apes are excellent for experimentation "And from the apes you should choose the ones that look more human and learn the nature of their bones accurately."<sup>9</sup> From the above comparisons between current views and Galen's similar stance, it can be assumed that the ancients considered the apes similar but different from man. Two more extracts from medical writers of the same era strengthen this assumption. Aretaeus from Cappadocia (1<sup>st</sup> cent. AD), whilst prescribing a remedy for facial oedema, recommended mixing the ashes from vine-branches with the fat of some exotic animals and applying the mixture to the face. The remedy was considered potent because: «It is excellent [to use] a substance that looks alike with something unlike it, as exactly a monkey to man». <sup>10</sup> Also, Soranus (2<sup>nd</sup> cent. AD) refers to the story of some pregnant women who after seeing two monkeys copulate, gave birth to "monkey-//ke" children.<sup>11</sup>

The best argument about the ancient Greek writers' adherence to the theory that the species are similar but not identical is the very term they used for naming an ape. It was "pithikos", a noun deriving from the future tense "pithiso" of the verb "pitho" which means "I am persuasive, or capable of deceit", because an ape (pithikos) is capable, due to its resemblance to man, of persuading the simple-minded that it is identical to man.<sup>12</sup>

Later, the Romans used the Latin term "simio" to stand for ape and this may derive from the word "similes, similo" because of the monkey's similarity with humans<sup>13</sup>. Even later, in Medieval Britain, an ape was used to represent the quack that imitated medical doctors.<sup>14</sup> It is apparent that modern knowledge on ape genetics verifies the name that the Greeks had for it.

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**Fig 1 Legend:**

Engraved frontispiece from the 1685 book "Observationes Medicae", depicting an ape, as the remote archetypal relative of the man and the woman (Tulp N. Observationes medicae. Editio nova, libro quarto auctior et sparsim multis in locis emendation Amsterdam, Wetsten 1685 Bibliographical reference Garrison-M 3737; Hirsch-H.V, 657, Waller 9718).