

LETTER TO EDITOR

Received 2016-06-26

Revised 2016-07-09

Accepted 2016-07-26

Pitfalls of Animal Study: Avicenna's View

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Dear Editor,

Undoubtedly, animal models have an important role in the development of basic biomedical sciences [1]. Also, preclinical animal studies have been used to determine the safety and efficacy of treatments before conducting human trials [2]. However, there is a growing uncertainty regarding the essentiality of animal studies in the progress of medicine [3]. It has frequently been reported that the results of these studies are poorly replicated in human studies even in high-quality animal investigations [3, 4].

Regarding the lack of evidence showing the benefits of animal research, poor methodologies, publication bias due to unpublished negative results, and inadequate systematic reviews and meta-analyses of animal studies are the main concerns [2, 5]. Moreover, there are so many obvious and obscure discrepancies between human and animals in different aspects of which, the diversity in their metabolism seems to be the most important one.

Nowadays, personalized medicine as a newcomer in the field of modern medicine is focusing on individual differences in pathogenesis and treatment of the diseases [6]. Similarly, the concept of Mezzaj (constitution) which is one of the fundamental theories of Traditional Persian Medicine (TPM), is attributed to the necessity of personalization in

medicine. The Mezzaj, which is the final average of four main qualities of hotness, coldness, wetness, and dryness, helps physicians to assess deviations of body organs from their normal homeostasis and differences between individuals [7, 8].

In this regard, Avicenna (980-1037 AD), one of the great scholars of the Islamic Golden Age [9], believes that the normal constitution range of human's body is completely different from animal's. Accordingly, the effects of drugs on animals could not be extended to the humans. In the second book of his masterpiece, Canon of medicine, he asserted that one of the criteria of drug evaluation in experimental approach is that it should be tested on humans because of its different power and effect on various animal species in comparison to humans. He also gives some examples such as Chinese rhubarb (*Rheum palmatum*) which cause hotness in human and coldness in lion and horse, or rather some materials which are poisonous to humans in spite of their ineffectiveness in animals [10].

It seems that current evidence besides our previous knowledge shows a necessity for revision in the application of animal studies in biomedical sciences.

Keywords: Animals; Research Methodology; Experimental Design; Avicenna; Traditional Persian Medicine

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References

1. Lynch VJ. Use with caution: Developmental systems divergence and potential pitfalls of animal models. *Yale J Biol Med.* 2009; 82(2): 53-66.
2. Ritskes-Hoitinga M, Leenaars M, Avey M, Rovers M, Scholten R. Systematic reviews of preclinical animal studies can make significant contributions to health care and more transparent translational medicine. *Cochrane Database Syst Rev.* 2014;3:ED000078.
3. Martić-Kehl MI, Schibli R, Schubiger PA. Can animal data predict human outcome? Problems and pitfalls of translational animal research. *Eur J Nucl Med Mol Imaging.* 2012; 39(9): 1492-6.
4. Hackam DG, Redelmeier DA. Translation of research evidence from animals to humans. *JAMA.* 2006;296(14):1731-2.
5. Pound P, Ebrahim S, Sandercock P, Bracken MB, Roberts I, Group RATS. Where is the evidence that animal research benefits humans? *BMJ.* 2004; 328(7438): 514-7.
6. Hamburg MA, Collins FS. The path to personalized medicine. *N Engl J Med.* 2010;363(4):301-4.
7. Mojahedi M, Naseri M, Majdzadeh R, Keshavarz M, Ebadini M, Nazem E, et al. Reliability and validity assessment of Mizaj questionnaire: a novel self-report scale in Iranian traditional medicine. *Iran Red Crescent Med J.* 2014; 16(3): e15924.
8. Nimrouzi M, salehi A, Ahmadi A, Kiani H. Avicenna's medical didactic poems: Urjuzeh Tebbi. *Acta Med Hist Adriat.* 2015;13 Suppl 2:45-56.
9. Daneshfard B, Dalfardi B. Medieval roots of modern knowledge regarding carotid sinus syncope. *Int J Cardiol.* 2014;173(2):342-3.
10. Avicenna H. *Ghanoon Dar Teb [The Canon of Medicine]*, Bulaq Edition. Sharafkandi A, trans Tehran: Univ of Tehran Pr. 1978.