

## ORIGINAL ARTICLE

### Avicenna's Concept of Cardiovascular Drug Targeting in *Medicamenta Cordialia*

#### Abstract

Avicenna (980 – 1037 AD) known as the prince of physicians in the west was one of the most prominent Persian thinkers, philosophers, and physicians. Owing to his interests in cardiology, he authored considerable works on different aspects of cardiology. “*Resaley-e-Ragshenasi*” (Book on Pulsology) and “*Kitab al-Adviyt-ol-Qalbiye*” (the book on drugs for cardiovascular diseases) are Avicenna's great dedication to the field of cardiology. In the field of drug therapy, an important concept which Avicenna touched on was the approach of drug achievement to the site of action in an easier and more efficient way. The mentioned concept is now recognized as “drug targeting” in current medicinal sciences and is an important challenge and field of research in pharmacy. Drug targeting has its starting point just a few decades ago. whereas Avicenna considered the strategy 1000 year ago.

**Key words:** Avicenna, Drug targeting, History of medicine, Cardiology, Persia

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### Introduction

Avicenna (980 – 1037 AD) known as the prince of physicians in the west was one of the most prominent Persian thinkers, philosophers, and physicians.<sup>1</sup> He wrote more than 400 books and treatises on different subjects, medicine being one of the aspects that Avicenna impressively contributed to. According to his interests in cardiology, he authored considerable works on different aspects in cardiology. “*Resaley-e-Ragshenasi*” (Book on Pulsology) and “*Kitab al-Adviyt-ol-Qalbiye*” (the book on drugs for cardiovascular diseases) are Avicenna’s great dedication to the field of cardiology. In the third volume of Canon, Avicenna also assigned a big portion of the book to the various types of cardiovascular diseases, their causes, effects, and treatment strategies.<sup>2,3</sup> The book on drugs for cardiovascular diseases, known in Latin as *Medicamenta Cordialia*, deals with simple medicines and compound formulations which were applied for the cardiovascular disorders.<sup>4</sup> In the field of drug therapy, an important concept which Avicenna touched on was the approach of drug achievement to the site of action in an easier and more efficient way.<sup>5</sup> The mentioned concept is now recognized as “drug targeting” in current medicinal sciences and is an important challenge and a field of research in pharmacy. Drug targeting has its start point a few decades ago<sup>6</sup> whereas Avicenna considered the strategy 1000 year ago.<sup>7</sup>

### Cardiovascular drug targeting in *Medicamenta Cordialia*

In the mentioned book, Avicenna noted the specific mechanisms of action for cardiovascular drugs before he described each medicament or compound formulation. He also defined the exact role of each medicine in the treatment. Some medicaments meant to be applied for their own specific therapeutic effect. Otherwise some ingredients were used for drug targeting. In this regard, a group called as mofatehat was described. Avicenna believed that these medicaments were capable of easily transporting the heavy and active ingredients through blood vessels. Accordingly, they, as the target of cardiovascular agents, could reach faster to the heart. Moreover, rapid onset of action could be achieved in this condition.<sup>8</sup> Lemon balm (*Melissa officinalis* L.) and Behmen (*Centaurea behen* L.) were related examples which were mentioned in *Medicamenta Cordialia*. Narcotic drugs were the second group mentioned by Avicenna. This group was meant to be

- 1- Zargaran et al, 2012: 389-90.
- 2- Khan, 1986: 315-25.
- 3- Zareshenas et al, 2011: 243-4.
- 4- Faridi et al, 2010: 634-5.
- 5- Avicenna, 1025/2009.
- 6- Petrak, 2005: 1667-73.
- 7- Avicenna, 1025/2009.
- 8- Ibid

applied for preservation of active ingredient's potency and efficacy in the way to the hearth. They were also used to hold the active component longer in the site of action. The third group was used to enhance permeation and increase the onset of action. According to Avicenna, grape distillate, date palm and sugar, in combination with the active ingredient, can play this action in the field of drug targeting. Avicenna also introduced saffron as a specific carrier for cardiovascular drugs. Other cardiovascular therapeutic effects related to saffron was also mentioned in the book.<sup>9</sup>

In addition, Avicenna introduced different routes of administration in order to achieve faster and easier cardiologic drug delivery. Although most of medicaments were applied orally, some sublingual or nasal administrations were reported by Avicenna. The mineral agents, such as ruby and pearl, suggested for the treatment of cardiovascular disease had to be kept in mouth or under the patient's tongue for a certain period. Moreover, smelling rose flower was reported to have therapeutic effects on the heart. Avicenna also denoted that aromatic medicines might have better effects on the heart and their nature and aromatic properties helped to increase the influence of the drug. Totally 28 aromatic medicinal plants among 83 simple medicines are described in the Avicenna's *Medicamenta Cordialia*.<sup>10</sup>

### Conclusions

As we know drug targeting is a new approach in current medical and pharmaceutical sciences. Different ways, such as using a vector molecule, altering the pH value and/or temperature, directing drug application into the site, etc, were introduced to increase the influence of drug in the site of action.<sup>11</sup> Therefore, Avicenna's concept on cardiovascular drug delivery and targeting now deserves to be considered as his invaluable contribution to the field of cardiovascular medicine. Whereas he was a great philosopher and scientist, he worked rationally based on observations and had considerable findings in various branches of science; therefore, probably the mentioned strategies for drug targeting may be beneficial for further investigations. Finally, Avicenna's points of view can show exclusive standpoints of him in cardiovascular medication and his unique drug targeting concept towards the heart.

9- Ibid

10- Ibid

11- Torchilin, 2000: S81-91.



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