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Ancient voices on tinnitus: the pathology and treatment of tinnitus in Celsus and the Hippocratic Corpus compared and contrasted

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Abstract

Objective: The object of the paper is to analyse the treatment of tinnitus in two ancient works, Celsus De Medicina and the Greek Hippocratic Corpus. Whilst reviews of historical references to tinnitus have identified this material, this is the first detailed treatment of the subject in these authors. **Design:** The paper considers the material relating to tinnitus and suggested treatments in the Roman medical writer Celsus (mid first century AD) in contrast with those found in the Greek Hippocratic Corpus (late fifth, early fourth century BC). **Results and Conclusion:** The lifestyle change, diet and pharmacological treatments suggested by Celsus are analysed and shown as likely to be effective. Celsus is shown to be remarkably modern in his understanding of the aetiology of the disease and his suggested dietary and pharmacological treatments appear to be soundly based. Celsus' pharmacological approach differs from the more theoretical stance of the Hippocratic Corpus based on humoural theory. The Hippocratric Corpus is more detailed in its descriptions of otological pathology and more concerned with a humoural explanation of the disease, but offers useful advice on diet and regimen and also provides the first detailed description of what appears to be Ménière's Syndrome.

Keywords: ancient, history, materia medica, tinnitus.

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INTRODUCTION

Tinnitus remains a clinical and scientific enigma, and has been considered by medical and scientific authors throughout history. Such material has been summarised and reviewed by several modern authors[1-3] but in each case the perspective has been an overview rather than an in-depth and contextual analysis of particular authors which would build upon these previous studies.

The author at the centre of this study, Aulus Cornelius Celsus, was not a professional doctor, but rather an expert amateur. His work *De medicina*, in eight books, was originally part of a much larger encyclopaedia, called the *Artes*, and was intended for an elite Roman audience and also contained books now lost on agriculture, rhetoric, philosophy and military strategy. His work was known to Pliny the Elder (AD 23-79) and Columella (fl. AD 50), and the period of AD 14 to 39 best suits the sparse evidence we have for the dating of his work[4]. The central section of this work, books 5 and 6, is concerned with *materia medica*, and the particular portion dealing with hearing complaints is book 6 section 7. No single source has been identified for this work, and it is clear that he had read extensively amongst earlier Greek medical writers and made use of a wide range of earlier specialist texts[5].

The present study aims to analyse how Celsus considered tinnitus and how it might be treated, for which comparisons can be made with the treatments offered in the Greek Hippocratic Corpus (late fifth century BC). When comparing Celsus with the sparse Hippocratic writing in this area, it is clear that Celsus is much more concerned with the use of pharmacological cures and less with humoural theory, which is the main focus of Hippocratic treatments.

The humoural theory is found for the first time in works of the Hippocratic Corpus and is later refined and standardised by Galen. In its original form as found in the Hippocratic work *On the Nature of Man* the theory states that the human body contains four humours: blood, phlegm, yellow bile and black bile (chapter 4). Health results from a harmonious mingling of these constituents, whereas pain results from one of them being in excess (chapter 4). Finally the four humours relate to the seasons with phlegm, as cold and wet, being most frequent in winter; blood, being moist and warm, in spring; yellow bile, being warm and dry in summer; black bile, being dry and cold, in autumn (chapter 7).

In his treatments Celsus is more selective than his contemporaries in avoiding the more outlandish (to modern eyes at least) folk remedies recommended by writers such as Pliny, e.g. in Pliny *Natural Histories* 20.162, veal suet with wild cumin is used as a cure for tinnitus. However Celsus was not averse to traditional rural remedies[6], which he sometimes gives alongside the treatments of the conventional medical practitioners[7]. As far as his discussion of is concerned, the present paper assesses Celsus' knowledge of audiological pathology and the potential effectiveness of his proposed treatments.

Tinnitus in Celsus

In the first paragraph of his discussion Celsus speaks of three causes of tinnitus:

(1) The common cold causes a mild form;

(2) Diseases (unspecified) and prolonged headaches give rise to a more serious form;

(3) The onset of serious disease, especially epilepsy, causes the most serious form:

> *Celsus 6.7.8a Another type of problem is when the ears produce a ringing sound within themselves; and because of this it also comes about that they cannot receive sounds from outside. This is least serious (1) when it comes about through a cold; worse (2), when caused by diseases or prolonged head-aches; worst of all (3) when it precedes the onset of serious illnesses, especially epilepsy.*

Modern audiologists would concur with Celsus in seeing tinnitus as arising from a number of conditions and, although they would suggest more than three[8], those given by Celsus would be included among them. Firstly an upper respiratory tract infection can give rise to poor Eustachian tube function and middle ear dysfunction, leading to conductive hearing loss. In such circumstances tinnitus may be perceived as external sounds are reduced in perceived intensity, and the individual may become aware of any internal percept. Secondly, the association of troublesome tinnitus with malaise induced by illness is recognised. Thirdly, whilst a direct association between epilepsy and tinnitus is not commonly clinically observed, recent theories of tinnitus generation have considered the ways in which patterns of neuronal activity in the central nervous system can either induce or exacerbate tinnitus. Specifically, proponents of the theory of thalamo-cortical dysrhythmia indicate that the normal harmonious patterns of firing between the auditory thalamus and the cortex may be disrupted in troublesome tinnitus[9,10].

Next Celsus goes on to suggest some treatments, starting with tinnitus arising from a cold:

> *Celsus 6.7.8b If it is due to a cold, the ear should be cleaned and the breath held until some liquid froths out from it.*

One reading of this would be that the treatment consists of cleaning the ear. No detailed information is given as to the cleansing agent that might be used, but

the mention of breath holding and of liquid frothing out of the ears suggests perhaps the use of some substance such as soda dissolved in wine, as recommended by Pliny[11]:

> *Natural History* 31.117 *Soda dissolved in wine is poured into purulent ears; wax in the same organ it eats away in vinegar; noises and tinnitus it stops if added dry.*

In the case of tinnitus caused by a common cold, cleaning it would not resolve middle ear dysfunction. In the case of tinnitus caused by wax, on the other hand, cleaning the meatus in this way might be of benefit. Baking soda mixed with warm water is still used to remove wax, but this is usually seen now as a rather harsh treatment[12]. Wax dissolved by the soda can be washed or syringed out of the ear and the use of wine or vinegar as solvents, as suggested by Pliny (quoted above), would act as effective antimicrobial agents. Alternatively, the combination of breath holding and an emission from the ear may indicate a tympanic membrane perforation. It is difficult to see how tinnitus might be improved by such a procedure.

Celsus now moves on to the second cause of tinnitus, this being unspecified disease and headache. Here the treatment starts not with pharmacology but with regimen. The patient should start with exercise, massage, washing in hot water and gargling. Only slimming foods are to be eaten:

> *Celsus 6.7.8b (cont'd) If it arises from disease and pain in the head, the prescriptions as to exercise, massage, washing and gargling should be carried out. Only foods that make thin are to be used.*

These treatments involve good hygiene and lifestyle change. As such they resonate with modern approaches which involve stress reduction and physical therapy[13-16].

Next Celsus discusses the pharmacological components of the treatment for tinnitus arising from disease and headache:

> *Celsus 6.7.8b (cont'd) Into the ear radish juice should be dropped with oil of roses or with the juice of wild cucumber root; or castoreum with vinegar and laurel oil. Also veratrum (hellebore) is pounded up for this purpose in vinegar, then mixed with boiled honey, and a salve made of it introduced into the easr.*

Two alternative mixtures are suggested for drops to be inserted into the ear. In both cases there is an oily vehicle, to make sure that the substance adheres, either oil of roses or laurel oil. The first mixture then consists of radish juice, oil of roses and the juice of the wild cucumber root. Radish *raphanus satiuus* was a larger and coarser version of the modern radish, with a large swollen root more like a turnip is used earlier in 6.7.7c with vinegar and laurel oil for deafness[17-19].

Oil of roses was prepared from the fresh and dried petals of the damask rose. In ancient pharmacology it is used to clear up inflammation, mainly in ear complaints, and for example used as such in Celsus at 6.7.1c and 6.7.1d. It also appears in mixtures in Pliny 20.137 and 23.85 as a constituent of a tinnitus treatment. In modern times the rose plant has been suggested as a source of anti-depressant, antiseptic, antiviral, laxative and tonic substances[20,21]. The cucumber root contains bitter compounds known as cucurbitins, one of which has an anti-tumour effect. It is rich in antioxidants and contains a number of fatty acids which have been considered to have cooling and diuretic effects[22]. In Dioscorides 2.162, it is used, as here, with rose oil to cure earache. Earlier in Celsus at 6.7.7c it is applied to the ear with castoreum and crushed rose leaves to cure deafness. In Western folk medicine in general it is used to reduce heat and inflammation, particularly when applied to wound swellings.

Moving on to the second mixture, castoreum is the name given to the strongly odiferous, oily yellowish secretion of a sac near the anal area of both the male and female beaver, used in scent marking. The chemical contents depend to some extent on the food of the animals, but one important element contained is salicylic acid, an acid derived from eating twigs of willow. This acid is the basis of modern aspirin. It is commonly used by the ancients in compounds for the relief of earache and ear infections and appears no less than eleven times in Celsus' ear section. Vinegar, acetic acid, made from the fermentation of ethanol is the most widely used preparation in Celsus' section on ear complaints and it makes an appearance in Pliny in the context of tinnitus at 31.117. In ancient ear treatments generally it is frequently used to dissolve other compounds. The acid content, which is made up of tartaric as well as acetic acid, would potentially have had useful antiseptic and anti-fungal properties. In modern pharmacology vinegar-based products are used for their anti-fungal and anti-bacterial properties and have been applied to the treatment of ear infections[23].

Finally laurel oil is again a frequent component of Celsus' ear treatments, occurring again twice in the earlier section 6.7.7 on deafness and three times in the current section on tinnitus. In modern pharmacology the bark, leaves and fruit extracts of the laurel, *laurus nobilis*, have been shown to have anti-microbial properties[24,25].

As an alternative to these two mixtures Celsus suggests pounded *veratrum*, a type of hellebore with vinegar and boiled honey. The roots of *veratrum* are highly toxic and it has been applied in the treatment of mental disorders, sometimes with fatal effects[26-28]. This

plant, which belongs to the lilac family, has been shown by modern pharmacology to have anti-inflammatory and analgesic properties[29-31]. Celsus uses it on the ears only in severe cases, so here with tinnitus from long-standing disease and at 6.7.5 pounded up with vinegar to kill maggots in the ear. Honey again is very frequently used in ancient ear cures for example Celsus 6.7.8b and 6.7.8c, and Pliny *Natural Histories* 20.40, 20.137, 23.85. Its sticky consistency made sure that it and whatever drugs were mixed with it adhered to the site of the disease. Furthermore honey has been shown to act as a slow releasing antibacterial, excellent for external use as it is non-toxic and non-irritant[32].

Celsus then considered tinnitus which is not caused by any of the above mentioned reasons:

> *6.7.8c. If the noise begins without these reasons and so causes dread of some new danger, there should be inserted into the ear castoreum in vinegar or with either iris oil or laurel oil, or castoreum is mixed with this together with the juice of bitter almonds; or myrrh and soda with rose oil and vinegar. But in this case also there is more benefit from the regulation of diet, and the same is to be done as was prescribed above (8b), with even greater care. And, besides, until the noise has ceased the patient must abstain from wine.*

Celsus' description here is close to a modern observation, in that if the cause of tinnitus is unknown, patients often fear that a serious disease, such as a tumour, could be responsible. As in 6.7.8b, regimen, that is diet and exercise, is said to be more beneficial than drugs, with the added suggestion that the patient should abstain from wine. No reason is given for this.

As an alternative to the castoreum, vinegar and laurel oil mixture in the previous section, here a mixture of castoreum, vinegar and iris oil is suggested. Iris oil is a kind of paste made from the roots of the iris. The irises used were the common yellow waterside iris. The active ingredient was the oil in their rhizomes or roots. The ancients used hot iris ointment for eye infections, headaches and deafness. In modern medical practice these same rhizomes are used because the isoflavanoids that they contain have anti-inflammatory properties. They also have sedative and anti-cancer effects and significant antioxidant activity[33,34]. The ointment is used again in 6.7.1a for inflammation of the ear and in 6.7.1c., when the pain has subsided and the ointment is spread around the ears. It is used to cure infected blockages in the ears in 6.7.2a where it cures pus in the ear, and 6.7.6 where it is boiled up with honey and poured into the ear to cure a passage blocked with thick matter. It is also suggested that the juice of bitter almonds could be added to this mixture. Almond oil is used in modern pharmacology for its anti-inflammatory, immune boosting, anti-hepatotoxicity and anti-fungal effects[35]. The ancients knew of two types of almond, the bitter and the sweet. The bitter, as mentioned here, was the most common. The bitterness was caused by cyanide, which in wild almonds can reach toxic levels but in the cultivated type is mild enough simply to have an antiseptic effect. Almond oil is used earlier in 6.7 in cures for earache and severe inflammation of the ears. As an alternative to bitter almond juice Celsus suggests a mixture of myrrh and soda, with rose oil and vinegar. The soda, as discussed above, could have an important effect in effervescing and flushing out infected material or wax from the ear. Myrrh was a word applied to sweet scented gum from various species of African and Asian shrubs. The resin exudes from the trees in drops that the Greeks called *stacte*. It had a powerful and lasting odour and was used in Egypt and the Near East as an embalming agent. Modern pharmacologists have found that it contains tannins and has astringent properties. It is used in making antiseptics for wounds and as a gargle for sore throats and problems with teeth and gums. It is also an anti-inflammatory[36]. It is used commonly in Celsus in compounds against earache and particularly where pus and other substances are emitted from the ear. An example of myrrh being used to cure complaints involving eruptions from the ears occurs at Celsus 6.7.8c

In summary, within Celsus' teaching on tinnitus, there are some interesting observations both on the heterogeneity of tinnitus but also on the distinction between infective causes and idiopathic tinnitus. The treatments are set out in an ascending scale from aural hygiene in 6.7.8b to the insertion of preparations of increasing strength through 6.7.8b and 6.7.8c. Tinnitus is one of the few areas in the section on ears where the importance of lifestyle and diet is mentioned. In this area Celsus reveals his debt to Hippocratic medicine.

Previous Treatments of Tinnitus in the Hippocratic Corpus

At this point it would seem appropriate to compare andcontrast Celsus' ideas on tinnitus with the Hippocratic discussion of the same complaint in *Diseases* 2 and 3[37]. To take first the discussion in *Diseases* 2.4:

> *If around the brain, small vessels overfill with blood… the vessels are raised up and throb, pain occupies the entire head, the ears ring and the patient hears nothing. The ears ring because the vessels are throbbing and quivering, for then there is a ringing in the head. The patient is hard of hearing, partly on account of the sound and ringing and partly because the brain and vessels around it swell up; for owing to the overheating that occurs, the brain by itself*

fills up the empty space in the direction of the ear; therefore as the same amount of air as in the time before is no longer present, and thus does not provide the same sound, what is said does not register with the patient, and for this reason he is hard of hearing.

The Hippocratic work, in contrast with Celsus, is much more concerned with the mechanism behind what is causing the phenomenon of tinnitus. The influence of humoural theory can be seen clearly in the emphasis on excess of blood and heat in the head. There is also more emphasis on the physiology of hearing. As a result of the excess of blood and heat in the head the brain was thought to swell to fill some of the auditory cavity that normally would be filled by air, thus affecting the patient's perception of sound. Whilst the tinnitus percept is here described as 'ringing' rather than beating or banging, it may be that the phenomenon of pulsatile tinnitus, wherein the individual hears a rhythmic sound, often pulse synchronous[38,39], underpins these observations.

The next mention of tinnitus in *Diseases* 2 comes at 2.15:

The patient cannot tolerate wind or sun; his ears ring, he is vexed by any noise, and he vomits saliva and scum, sometimes food as well… When the case is such, first give the patient a medication to drink that will draw phlegm upwards, and after that clean out the head.

This passage seems to be treating tinnitus which is connected with sensory over-sensitivity, specifically to wind, sun and noise. Tinnitus is often linked with hyperacusis or over-sensitivity to normal levels of sound and is an important symptom in Ménière's syndrome. The humoural explanation also differs from that found at 2.4. In this case it consists of an excess of phlegm that should be cleared from the head. It may be that this is an early reference to Ménière's syndrome, characterised by episodic rotary vertigo, hearing loss and tinnitus. The Hippocratic passage does not mention vertigo, but only the accompanying sickness, though vertigo is mentioned in another possible unnoticed ancient reference to this syndrome in Pliny's *Natural History* 20.69:

The juice (of beet) relieves headache and giddiness, noises in the ears if poured into them.

An alternative explanation of the phrase "vexed by noise" might be the individual is experiencing hyperacusis, or a reduction in sound tolerance, which is commonly accompanied by irritation and emotional distress.

The final Hippocratic mention of tinnitus occurs at Diseases 3.1:

The patient's ears are filled with ringing, he hears unclearly, and the vessels in his head are stretched, and throb; sometimes fevers and chills occur as well… When the patient is suffering intense pain, you must cool his head - best after shaving it - by pouring cooling agents such as nightshade juice and potter's earth into a bladder or length of gut; alternately apply and remove this before it becomes warm. Also, draw off blood, and clean out the head with fragrant substances mixed with celery juice. Let the patient abstain totally from wine, give him cold barley water as gruel, and empty his lower cavity.

Here the reference to the vessels in the head being stretched, seems to revert to the type caused by excessive blood described in 2.4 Consequently the treatment involves removal of blood in addition to cooling the head to relieve excess heat. The abstention from wine was also recommended by Celsus in 6.7.8c.

Although Diseases 2 and 3 along with internal affections (all perhaps from the end of the fifth century BC) are the three nosological treatises of the corpus to include pharmacological recipes, there is no internal use whatsoever of pharmaka, in the ears. Nightshade juice[40] is applied in 3.1 externally as a cooling agent, and the head is cleaned with fragrant substances mixed with celery juice[22]. The only medication recommended in 2.15 is an emetic to draw excess phlegm from the body.

CONCLUSION

In conclusion Celsus, in comparison with the Hippocratic Corpus, is free from explanations related to humoural theory and concentrates mainly on practical treatments not found in Hippocrates and on sensible advice regarding lifestyle and diet. As such the work of Celsus regarding tinnitus represents the well-educated Roman approach which is willing to give equal weight to effective herbal treatments and to Hippocratic theory on diet and life-style.

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REFERENCES

1. Stephens SDG. Historical aspects of tinnitus. In: Hazell JP. Tinnitus. London: Churchill Livingstone; 1987. p.1-19.
2. Stephens D. A history of tinnitus. In: Tyler R. Tinnitus handbook. San Diego: Singular; 2000. p.437-48.

3. FeldmannH. History of tinnitus research. In: Schulman A. Tinnitus diagnosis/treatment. San Diego: Singular; 1997. p.3-37.
4. Langslow DR. Medical Latin in the Roman empire. Oxford. Oxford University Press; 2000. p.44-124. DOI: http://dx.doi.org/10.1163/156852500510778
5. Serbat G. Celse, De la médecine, i: Livres 1-1. Paris: Les Belles Lettres; 1995. p.liii-lxviii.
6. Nutton V. Ancient medicine. Abingdon: Routledge; 2004. p.166.
7. Spencer WG. Celsus de Medicina with an English translation. London: William Heinemann; 1971. Praef. 1, 4.13.3, 5.28.7, 6.9.7.
8. Wilson JP. Theory of tinnitus generation. In: Hazell JWP. Tinnitus. Edinburgh: Churchill Livingstone; 1987. p.20-45.
9. De Ridder D, van der Loo E, Vanneste S, Gais S, Plazier M, Kovacs S, et al. Theta-gamma dysrhythmia and auditory phantom perception. J Neurosurg. 2011;114(4):912-21. DOI: http://dx.doi.org/10.3171/2010.11.JNS10335
10. van der Loo E, Gais S, Congedo M, Vanneste S, Plazier M, Menovsky T, et al. Tinnitus intensity dependent gamma oscillations of the contralateral auditory cortex. PLoS One. 2009;4(10):e7396.
11. Jones WHS. Pliny's Natural history. Vol VII. London: William Heinemann; 1975. p.451.
12. Deafness Research UK - http://www.deafnessresearch.org.uk/Earwax+1887.twl
13. Andersson G, Lyttkens L. A meta-analytic review of psychological treatments for tinnitus. Br J Audiol. 1999;33(4):201-10. PMID: 10509855
14. Andersson G, Strömgren T, Ström L, Lyttkens L. Randomized controlled trial of internet-based cognitive behavior therapy for distress associated with tinnitus. Psychosom Med. 2002;64(5):810-6. PMID: 12271112 DOI: http://dx.doi.org/10.1097/01.PSY.0000031577.42041.F8
15. Rief W, Weise C, Kley N, Martin A. Psychophysiologic treatment of chronic tinnitus: a randomized clinical trial. Psychosom Med. 2005;67(5):833-8. PMID: 16204446 DOI: http://dx.doi.org/10.1097/01.psy.0000174174.38908.c6
16. Payne H. Pilot study to evaluate dance movement psychotherapy (the Body Mind approach) in patients with medically unexplained symptoms: Participant and facilitator perceptions and a summary discussion. Body Mov Dance Psychother. 2009;4(2):77-94. DOI: http://dx.doi.org/10.1080/17432970902918008
17. Polya G. Biochemical targets of plant bioactive compounds: a pharmacological reference guide to sites of action and biological effects. Boca Raton, Fl: CRC Press; 2003.
18. Chevallier A. The encyclopedia of medicinal plants. London: Doring Kindersley; 1996. p.310.
19. Bown D. Encyclopaedia of Herbs and their Uses. London: Doring Kindersley; 1995. p.327.
20. Umezu T, Ito H, Nagano K, Yamakoshi M, Oouchi H, Sakaniwa M, et al. Anticonflict effects of rose oil and identification of its active constituents. Life Sci. 2002;72(1):91-102. DOI: http://dx.doi.org/10.1016/S0024-3205(02)02197-5
21. Bayrak A, Akgül A. Volatile oil composition of Turkish rose (rosa damascena). J Sci Food Agr. 2006;64(4):441-8. DOI: http://dx.doi.org/10.1002/jsfa.2740640408
22. Souri E, Amin G, Farsam H, Barazandeh Tehrani M. Screening of antioxidant activity and phenolic content of 24 medicinal plant extracts. DARU J Pharm Sci. 2008;16(2):83-7.
23. Johnston CS, Gaas CA. Vinegar: medicinal uses and antiglycemic effect. MedGenMed. 2006;8(2):61.
24. Özeau M, Erkmen O. Antimicrobial activity of the essential oils of Turkish plant spices. Eur Food Res Technol. 2004;212(6):658-60.
25. Yalçin H, Anik M, Sanda MA, Cakir A. Gas chromatography/mass spectrometry analysis of Laurus nobilis essential oil composition of northern Cyprus. J Med Food. 2007;10(4):715-9.
26. Gaillard Y, Pepin G. LC-EI-MS determination of veratridine and cevadine in two fatal cases of Veratrum album poisoning. J Anal Toxicol. 2001;25(6):481-5. DOI: http://dx.doi.org/10.1093/jat/25.6.481
27. Grobosch T, Binscheck T, Martens F, Lampe D. Accidental intoxication with Veratrum album. J Anal Toxicol. 2008;32(9):768-73. PMID: 19021933 DOI: http://dx.doi.org/10.1093/jat/32.9.768
28. Van Wassenhoven M. Towards an evidence-based repertory: clinical evaluation of Veratrum album. Homeopathy. 2004;93(2):71-7. DOI: http://dx.doi.org/10.1016/j.homp.2004.02.007
29. Launert E. Edible and Medicinal Plants. London: Hamlyn; 1981.
30. Grieve M. A modern Herbal. New York: Dover; 1971.
31. Chiej R. Encyclopaedia of medicinal plants. St Louis: MacDonald; 1984.
32. Cooper RA, Molan PC, Harding KG. Antibacterial activity of honey against strains of Staphylococcus aureus from infected wounds. J R Soc Med. 1999;92(6):283-5.
33. Rigano D, Formisano C, Grassia A, Grassia G, Perrone A, Piacente S, et al. Antioxidant flavonoids and isoflavonoids from rhizomes of Iris pseudopumila. Planta Med. 2007;73(1):93-6. PMID: 17315314 DOI: http://dx.doi.org/10.1055/s-2006-957071
34. Rahman AU, Nasim S, Baig I, Jalil S, Orhan I, Sener B, et al. Anti-inflammatory isoflavonoids from the rhizomes of Iris germanica. J Ethnopharmacol. 2003;86(2-3):177-80. PMID: 12738083
35. Jenkins DJ, Kendall CW, Marchie A, Parker TL, Connelly PW, Qian W, et al. Dose response of almonds on coronary heart disease risk factors: blood lipids, oxidized low-density lipoproteins, lipoprotein(a), homocysteine, and pulmonary nitric oxide: a randomized, controlled, crossover trial. Circulation. 2002;106(11):1327-32. PMID: 12221048 DOI: http://dx.doi.org/10.1161/01.CIR.0000028421.91733.20
36. Hanus LO, Rezanka T, Dembitsky VM, Moussaieff A. Myrrh--Commiphora chemistry. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub. 2005;149(1):3-27. PMID: 16170385 DOI: http://dx.doi.org/10.5507/bp.2005.001
37. Potter P. Hippocrates. Vol. V (Diseases I and II), Vol. VI (Diseases III). London: William Heinemann; 1988.
38. Liyanage SH, Singh A, Savundra P, Kalan A. Pulsatile tinnitus. J Laryngol Otol. 2006;120(2):93-7. DOI: http://dx.doi.org/10.1017/S0022215105001714
39. Arganbright J, Friedland DR. Pulsatile tinnitus. Otol Neurotol. 2008;29(3):416. DOI: http://dx.doi.org/10.1097/MAO.0b013e3181514459
40. US National Library of Medicine. Belladonna [Cited 2013 September 7). Available from: http://mplus.nlm.nih.gov/medlineplus/druginfo/natural/patient-belladonna.html

When comparing Celsus with the sparse Hippocratic writing in this area, it is clear that Celsus is much more concerned with the use of pharmacological cures and less with humoural theory, which is the main focus of Hippocratic treatments. The humoural theory is found for the first time in works of the Hippocratic Corpus and is later refined and standardised by Galen. In its original form as found in the Hippocratic work On the Nature of Man the theory states that the human body contains four humours: blood, phlegm, yellow bile and black bile (chapter 4). Health results from a harmonious mingli... Treatment of tinnitus: A controlled comparison of masking and placebo. British Journal of Audiology, Vol. 21, Issue. 1, p. 37.Â Scurlock, Joann and Stephens, Dafydd 2008. A ringing endorsement for Assyro-Babylonian medicine: The diagnosis and treatment of tinnitus in 1st Millenium BCE Mesopotamia. Audiological Medicine, Vol. 6, Issue. 1, p. 4. The object of the paper is to analyse the treatment of tinnitus in two ancient works, Celsus De Medicina and the Greek Hippocratic Corpus. Whilst reviews of historical references to tinnitus have identified this material, this is the first detailed treatment of the subject in these authors.Â Celsus' pharmacological approach differs from the more theoretical stance of the Hippocratic Corpus based on humoural theory. The Hippocratric Corpus is more detailed in its descriptions of otological pathology and more concerned with a humoural explanation of the disease, but offers useful advice on diet and regimen and also provides the first detailed description of what appears to be MÃ©niÃ¨re's Syndrome. Discover the world's research. What causes tinnitus? Tinnitus (pronounced tin-NY-tus or TIN-u-tus) is not a disease. It is a symptom that something is wrong in the auditory system, which includes the ear, the auditory nerve that connects the inner ear to the brain, and the parts of the brain that process sound. Something as simple as a piece of earwax blocking the ear canal can cause tinnitus. But it can also be the result of a number of health conditions, such as Tinnitus is the perception of sound when no corresponding external sound is present. Nearly everyone will experience a faint "normal tinnitus" in a completely quiet room but it is only of concern if it is bothersome or interferes with normal hearing or correlated with other problems. While often described as a ringing, it may also sound like a clicking, buzzing, hiss, or roaring. The sound may be soft or loud, low or high pitched, and often appears to be coming from one or both ears or from the head...