How do cathartic drugs act?
A case study on Gregor Horst (1578-1636) and his attempt to defend Galenist theory.

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Summary

This case study deals with the argument of the Galenist author Gregor Horst (1578-1636), Medical Professor at Giessen University, Germany, and later town physician in Ulm, in the discussion on how purgatives act. Horst tried to reconcile a number of different opinions within a Galenist framework. His vast erudition enabled him to compare several classical as well as contemporary opinions. He takes into account Galen (129-C.200/216), Erasistratos (c. 330-255 BC), Asclepiades (fl. Ist century BC), the Hippocratic Corpus and the Problemata Aristotelis from antiquity, Mesue and Mundinus (c. 1270-1326) from the Middle Ages, and Jean Fernel (c. 1497-1558), Girolamo Cardano (1501-c. 1576), Johannes Costaeus (d. 1603), Laurent Joubert (1529-1583), Francisco Valles (1524-1592), Tobias Dorncreilius (1571-1605) and Gabriele Falloppio (1523-1562) from contemporary authors. Horst also integrated some Paracelsian ideas from Joseph Duchesne alias Quercetanus (1549-1609). In his attempt to preserve fundamentals of Galenic thought, Horst created a complicated theory nearly breaking under its own weight. He shows a rising divergence within traditional views as well as the fragmentation of Renaissance Galenism which took place already before the discovery of the blood circulation.

Résumé


Introduction

According to ancient Greek humoral pathology, the balance of four body fluids, called humours - blood, yellow bile, black bile and phlegm - is responsible for good health. The four
humours possess certain characteristics, the primary qualities warm, cold, moist and dry. Blood is warm and moist, yellow bile warm and dry, black bile cold and dry, and phlegm is cold and moist. Secondary qualities, such as density, rarity, lightness, gravity, hardness and fragility, supposedly result from a specific mixture of primary qualities (1). "Galen regards all part of the body as a combination of the primary qualities, but modified by the addition of secondary qualities" (2). Excess of a particular humour or corrupt humours can lead to disease. Corrupt humours which cannot be improved, or an excess of a humour, have to be eliminated from the body. This removal, called purging, was seen as an important method of treatment from the time of Galen (129-c. 200/216) far into Early Modern times (3). The extensive use of purgatives in the treatment of the French king Louis XIV. (1638-1715) (4) is just one example of its great popularity in the 17th century.

The theoretical framework which justified the use of purgatives in Early Modern Galinism can be seen very well in the writings of Gregor Horst. Horst, professor at Giessen University, Germany from 1608 until 1622 and afterwards town physician in Ulm (5), defended Galenism in the early 17th century(6). He was held in high esteem by his contemporaries and called "deutscher Askulap" (7).

Four reasons make Horst very suitable for a case study: He considers purging an important part of his treatment. His vast erudition enables him to compare the views of a large number of classical and contemporary authors. He usually acknowledges his sources when he cites different opinions. Last, but not least, in his "Opera medica", which were edited by his son and include nearly all his writings, Horst does not present only textbook knowledge. At the end of the chapter on purgatives, he concludes with the "quaestiones", points of discussion among contemporary authors. So the reader gets a first-hand account of Horst's argumentation.

Horst had to meet the challenges of his day from within and outside traditional medicine. Already the 16th century had seen diverging opinions on drug action among Galenists, as Owsei Temkin showed in the writings of the famous physicians Jean Fernel (1497-1558), Laurent Joubert (1529-1583) and Thomas Erastus (1527-1583) (8). Studying Horst, we can extend Temkin's insights into the early 17th century.

During the Renaissance traditional learned medicine flourished due to reception of ancient texts and thereby stimulated research. However, it also saw itself challenged by Theophrastus von Hohenheim, called Paracelsus (1493-1541) and his followers. Paracelsus had condemned Galenism. He tried to replace it by an alternative natural philosophy, based on folk medicine, religion, astrology and the three active principles salt, sulphur and mercury, representing solidity, inflammability and spiritousness, respectively. Paracelsian doctors who had gained influence on German courts, such as Oswald Croll (1560-1608) and Johannes Hartmann (1568-1631), made chemical remedies popular (9). Horst had to take Paracelsianism seriously. In the introduction to his "Opera medica", he compared the Paracelsists with Empiricists and Methodists in antiquity, in his view two sects justly criticized by Galen. In Horst's opinion, the Paracelsians do not care enough for the method of reasoning, relying too much on experience alone (10). For a short review of some fundamentals of Galenism which Horst would not give up easily, let us turn first to the opinions of Galen and Fernel - whom Horst held in high esteem (11) - on cathartic drugs and then access Horst's contribution to the controversy.

Drug action according to Galen and Fernel

"The nature of man" of the Hippocratic Corpus had already dealt with the action of cathartic drugs, drawing an analogy between seed and humours. For nourishment, seed draws from the
earth first what corresponds closest to its nature. Accordingly, a purgative attracts and evacuates the humour closest to its own nature before removing other humours (12).

Galen elaborated a theoretical structure for the classification of drug action. He stated that purgatives belonged to the group of drugs which acted by "similitude of the whole substance"(13). This "familiarity" or close relationship of the mixture between humour and drug supposedly led to the drug action resembling the attraction of the magnet for iron (14). Accordingly, a specific purgative would attract a specific humour and expel it from the body (15).

The other principle of drug action according to Galen derived from the principle contraria contrarissi (16).

Galen distinguished primary, secondary and tertiary qualities (or faculties) of drugs. The primary qualities are the elementary qualities hot, cold, moist and dry (17). Secondary qualities arise from different mixtures of the first qualities, leading to a relaxing, contracting, hardening, rarefying or solidifying effect (18). Tertiary qualities are primary or secondary qualities which have a special effect on, or lead to, a specific reaction of one part of the body (19). If the balance of the humours which constitutes health is disturbed in one direction, a remedy with the opposite quality is necessary. An excess of the hot quality, for example, leads to a fever. Therefore a remedy with the opposite or cold quality is indicated in order to restore health. Drugs supposedly acted by transmitting qualities into the body or replacing one quality with another (20).

Galen's doctrine of specific cathartics remained valid until the Renaissance : "As long as classical humoral pathology was basic to medicine, the doctrine of specific cathartics remained fundamental, too. The existence of specific cathartics, though not accepted by all physicians of all times, yet presented something of a dogma in the sixteenth century, and certain drugs were well-known for their specific action" (21).

Contrary to Galen, occult qualities were often described during the Middle Ages as tertiary qualities (22). Fernel used the terms "tertiary quality" and "occult quality" in order to describe drug actions which could not be derived from qualities accessible to the senses. Therefore, these drug actions had to be traced by observation of the effects they induced.

According to Fernel, the occult qualities of cathartics resulted from a "similitude of the whole substance" originating from an active inner principle, higher in rank than qualities and matter, the "form" (23). Fernel proposed the following mode of action : a magnet is active whenever in the vicinity of iron, but a specific cathartic is activated during its digestion with the help of the internal heat. While its substance remains in the stomach or intestines, the drug gives rise to an acrimonious vapour. This vapour spreads to all parts of the body through invisible ducts and thus reaches the noxious humour. By its acrimony, the vapour cuts up the humour. By its adverse quality it also strongly stimulates the containing part and provokes it to discharge the noxious humour. The local action of the vapour and the attractive action on the part of the substance of the drug together force the humour to descend to the stomach. So drug and humour are expelled after exciting the discharging faculty of the intestines (24).

Horst's discussion

Horst's own intention in examining the opinions of ancient and contemporary writers is, as he himself states, to provide a better exposition of the truth (25). He addresses three central points of discussion : is there a direct drug effect on the specific humour? How to deal with assertions that attraction is not the decisive
mode of action? How can the drug effects be traced back to the characteristics of the drug, in other words, how to explain the drug effects in terms of qualities, temperament and form?

Addressing the first question, Horst accepts the doctrine in the Hippocratic Corpus that specific cathartics do exist, drugs which eliminate a specific humour from the body. Therefore he rejects the Alexandrian doctor Erasistratos (c. 330-255 BC), known to him through Galen, who opposed the doctrine of specific cathartics. According to Erasistratos, the degree of fluidity is essential: a purgative evacuates every humour, starting with the most fluid and gradually moving to the more solid ones. Horst concedes only that the more fluid parts of a specific humour will be evacuated first because they can be removed from the body more easily (26).

Furthermore, Horst affirms a direct action of a drug on the humours. However, he does not dismiss the contrary opinion of the Bologna professor Girolamo Cardano (1501 - c.1576) entirely. Cardano had maintained that all action stems from a living body. The drug itself does not attract the humour directly but it affects the gastrointestinal tract which then attracts the humour. Horst argues that the magnet which attracts iron does not live. An influence of the drug on the intestines, however, supporting the evacuation of the noxious humour, is acceptable (27).

According to the Problematia Aristotelis, a swallowed purgative is dispersed within the body, liquifies noxious humours, and pulls these humours along, thereby purifying the blood. Horst judges this statement correct but insufficient, because this theory does not explain why a purgative purges one corrupt humour better than another and why it purges one part of the body better than another (28).

The assumption that attraction of humours is the central drug effect, had already been challenged in antiquity by Asclepiades, a physician in Rome in the 1st century BC. Asclepiades maintained that a drug could change the nature of a humour according to its own nature. A cholagogue for example supposedly created yellow bile within the body and then purged it, a mechanism different from attraction. Horst rejects this referring to his own experience (29).

In Renaissance medicine Joubert and Joseph Duchesne alias Quercetanus (1549-1609) had argued against attraction as the leading principle of purgation. Joubert, on the one hand, relied mainly on the expelling faculty of the body, and stressed contributory antipathy between drug and humour (30). According to Joubert, irritation of the expelling faculty - one of the natural faculties with which, according to Galen, all parts of the body are endowed - combined with antipathy between drug and humour leads to the evacuation from the body (31). His argumentation remains basically Galenist. Duchesne, on the other hand, is arguing for the Paracelsian camp. According to Paracelsism, not the elements but three chemical principles salt, sulphur and mercury are responsible for actions in nature and for the effect of drugs. Duchesne postulated a direct influence of the drug on the body. Salinic spirits of a purgative supposedly irritate the good-natured spirits of the body and stimulate them to excrete the humours. It is difficult for Horst to argue against these two positions. He asks - and thereby implicitly judges this mode of action unlikely - how a humour from the remotest parts of the body, far away from the intestines, could be forced into them by antipathy. Against the view that a suitable purgative taken in would attract such a humour, Joubert would not easily show that a purgative pushed a humour a long way into the intestines by means of antipathy. From all modes of action offered and all arguments Joubert can provide, the activation of the expelling faculty of the remote body parts would, according to Horst, play the main role in this regard (32).
This comes close to the mode of action Du-
chesne proposes. In short, Horst does not re-
ject the notion of antipathy entirely, but he would not
be in line with Joubert. Instead of an antipathy
between drug and humour, Horst maintains an
antipathy between the drug and the part of the
body where the noxious humour sits. Through
its antipathy the drug activates the expelling
faculty of this body part, which contributes to
force the humour into the intestines.

Now Horst turns to the main cause for cathar-
sis. Whereas the properties of many drugs are
explained today by their molecular structure and
their interaction with cell surfaces and receptors,
Galenist authors searched for explanations within
traditional theoretical pharmacology. So different
authors attributed properties of cathartic drugs
to the manifest primary and secondary as well
as to occult qualities. As far as the primary
qualities are concerned, Horst cites the analogy
between the sun and a drug. Accordingly, the
hot quality of a drug would be responsible for
evacuation just like the sun attracting moisture
from the ground. However, attraction of moisture
is, contrary to purgation, indiscriminate.
Therefore Horst concludes that the hot quality of
a drug only supports purgation (33).

The same is true for attributes originating
from a specific mixture of the qualities. Fran-
cisco Valles (1524-1592), personal physician of
the Spanish king Philipp II (1527-1598), had
suggested that, in combination with the hot
quality, characteristics such as colour,
consistence or friability were responsible for the
cathartic effect. Horst argues, that these
characteristics, however, can be changed by
decocction, extraction or infusion, whereby the
strength of the drug remains (34). He agrees
with the Luneburg town physician Tobias
Dormecrius (1571 -1605) that a higher degree of
acrimony and tenuity does not necessarily
indicate the greater strength of a purgative (35).
However, the tenuity and acrimony or bitterness
of a drug adds to its effect (36).

So the main effect is left to the "occult qualities"
and "similitude of substance". Here, Horst com-
bines the theories of Mesue (37) and his
commentators Mundinus (c.1270 - 1326) and
Johannes Costaeus (d. 1603) with those of Fernel
and Gabriele Falloppio (1523-1562). The occult
quality comes from heaven, as stated by Mesue
and his commentators. Vigour from heaven,
transferred to the forms, gives the drug the
power to purge. The mixture of the drug serves
the form in orderto fulfill its tasks (38). The mode
of action then is essentially the same as described
by Fernel : a purgative is agitated by the inner
heat and resolved, disperses vapours and spi-
rits, attracts humours and separates them from
others. The discharging faculty of the body is
excited and throws out the drug and the noxious
humour (39).

Contrary to Fernel, Falloppio maintains that
"similitude of substance" does not lie in the form
but in the temperament, coming forth from the
mixture of the primary (elementary) qualities.
This temperament is similiar to the temperament
of the noxious humour. The form determines
how something is mixed which leads to the
specific characteristics of the drug. Horst sides
neither with Falloppio nor with Fernel but
maintains that both modes of action of the same
drug are possible (40).

Conclusion

Horst provides a thorough look from the 17th
century back to antiquity on the one hand, and to
temporary discussions on the other. Horst’s
remarks show how difficult the task to reconcile
the views of some outstanding Galenists had
become in the early 17th century. In order to
explain the nature of occult qualities, Fernel
adhered to a theory which was openly rejected
by Falloppio, and Horst will not take sides
between the two. Aside from the authority of
Hippocrates and Galen, Horst does not have
convincing arguments to dismiss the concept of
antipathy between drug and humour in favour of
attraction. He tries to integrate antipathy by maintaining that an antipathy exists between drug and body, not between drug and humour. Paracelsian influences are accepted in a limited fashion and in such a way that they do not undermine the traditional framework. In short, Horst creates a complicated theory, nearly breaking under its own weight.

The rising divergence within traditional views without a revolutionary upheaval is part of the development of the theoretical structures within Galenism, which were neither static nor monolithic, but, on the aspect studied, creative and diverging. Horst's attempts of reconciliation are an example of the fragmentation of Renaissance Galenism already before the advent of the blood circulation which wrecked basic assumptions of Galenic physiology and therefore dealt a further blow to the authority of Galenism.

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Notes


2. Siegel, op.cit., note 1 above, p. 147.


10. G. Horst, Operum medicorum tomus primus... cura Gregorii Horstii Junioris, Gouda, Gulielmi vander Hoeve, 1666, p. 3 : «Haec est vera medicinae constitute, quam ob causam vehementer lapsi sunt olim Empirici & Methodici... Hodie duas hasce sectas una Pseudo-Hermetica repraesentat, a Theophrasto Paracelso ducens originem, qui veterum medicorum placitis nova principia sibi excogitavit & ita novam sectam a vera Alchymistica, quam olim Avicenna, Rhases, Villavovanus & alii propusuerunt, & cum rationali Medicina conjunxerunt, diversam constituit. Verum cum eadem secta, quatenus cum Empiricus convenit, intempestiva Experientia peccet, prout autem cum Methodici [sic] affinitatem habet, insufficient rationationis discursu utatur, ideo eandem suis reliquinimus tutoribus, & in verae Medicinae systemate constituoto acquiescimus».


20. Siegel, op.cit., note 1 above, p. 150.


25. Horst, op.cit., note 10 above, p. 362 : «Cum statim ab initio autor noster hanc quaestionem attingat, omnino necessarium est, ut eandem hie etiam pluriurum repentamus, ubi diversae quorundam tamen veterum quam recentiorum opiniones examinandae sese offerunt, de quibus agemus paucis, ut Veritas eo magis patefiat».


27. Horst, op.cit., note 10 above, p. 363 : «Cardanus de subtilit. et lib. 2 contr. tr. 1 contr. 3 novum figmentum de purgatione proponit, dum statuit omnemattractionem, quae fit ratione similitudinis substantiae, fieri a corpore vivente qua de causa concludit, pharmacum facere quidem ad attractionem humorum, sed non immediate, verum mediate, quatenus primum nova qualitate..."
ventriculum et intestina afficit, quae affecta tali qualitate peccantes humores trahunt, adeoque tractio ipsi fit a partibus viventibus... Verum hanc assertionem non immerito impugnat Fallopius, utpote cum primum fundamentum infirmum sit, quatenus omnis tractio non a vivente tantum proficiscitur, quemadmodum magnes et ferrum... confirmant...» G. Cardano, Contradicentium Medicorum libri duo, Parisiis, Apud Jacobum Macaeum, 1564, p. 9a.


29. Horst, op.cit., note 10 above, p. 362 : «Altera opinio est Asclepiadis, quam etiam Galenus passim refert, nimirum voluisse Asclepiadem Medicum, quod Medicamentum purgans evacuat determinate humores praeter naturam, verbi gratia cholagogum educabilem; non autem quasi illud ipsum taliestaip in corpore fuerit, sed quatenus medicamentum quemlibet humorem in sui naturam converteret, unde ex medicamento purgante non tantum sequeretur purgatio, sed etiam generatio determinati humoris. At vero quanquam negare non possimus, ipsum medicamentum actuationem separare et attrahere peccarent humorem, falsum tamen, ideoque punctum visum est quod totaliter eundem mutare queat, id quod aperte satis experientia confirmavit».

30. Temkin, op.cit., note 8 abore, p. 64.


32. Horst, op.cit., note 10above, p. 363 : «... itaetiam non facile monstrari potest a louberto, quomodo purgantia per antipathiam ex venis & remotissimis partibus humores fugent, unde confiteri cogitur, maxime partium expultricem hie agere, quatenus a medicamento irritatur... Non admodum ab opinione louberti quorumdam Hermeticorum assertio abludit, quemadmodum apuc Quercet. lib. II. defens. Herm. Med. cap. 7. ubi virtus purgatrix salinis spiritibus tribuitur, ita tamen, ut vis ilia non tantum in sale purgantium, quatenus simpliciter sal est, statutur, sed quatenus amatudo salis stipatur irritante quodam spiritu, cuius vi atque energia eiusmodi functiones obeantur. Siquidem (inquit Quercetanus) cum spiritus spiritibus facile connectantur, vitales expultrices nostrae facultatis spiritus facile a spiritibus salis provocantur ad eorum excretionem, a quibus irritantur. Salinos enim spiritus mordaces & acres benigni nostri spiritus fere nequeunt, quin illos tota vi commoti & irritati excludant, quibus expulsus pacati conquiescant etc. at partida victoria, inquit, cum hostibus perturbatis varia etiam pravorum humorum sarmec similis liberata est, quorum expulsio fere [sic, in Quercetanus original: vere] purgatio dicitur. Manifestum igitur, quod hie purgans medicamentum non alter quam per antipathiam agat...» ibidem, p. 364 : Nee omnis medicamentum neque benigni nostri spiritus fere nequeunt, quin propter antipathiam illam vis expultrix extimulata ad expellendum irritetur, quod vel maxime patet Opinione VII. dum salini spiritus nobis inimici purgationem peragere dicuntur... «L. Joubert, Paradoxorum decas Prima atque altera, Lugduni, Ad Salamandrae, 1566, p. 494. J. Duchesne, Ad veritatem Hermeticae medicinae ex Hippocratis etiam veterumque decretim, ac therapeutis propagandam, adversus cuiusdam anonymi Phantasmata Responsio, (Frankfort, W. Richter?, 1605), p. 61, pp. 63f.

33. Horst, op.cit., note 10 above, p. 362 : Sunt qui calori medicamenti vim attrahendi noxios humores attribuere conati sint: cum enim vidissent solem satis evidenter ex aquis et terris solius caloris beneficio ingentem exhalationem copiam attrahere... Quamquam vero negare non poBimus... calorem adjuvare purgatricem qualitatem medicamenti, longe tamen alia est attractionis ratio praedictarum rerum, quam in purgantibus, quippe sol absque discrimine caloris vi vapores quacunque materia humida producit...».
34. Ibid, p. 362: «Non autem hie sufficit Vallesii lib. 9. controvers. cap. l. auctarium, qui vi caloris attractionem succorum fieri decit, cum opinione praeecedenti, sed addito, quod illa tractio non eaequaliter omnes, sed certos tantum homines respiciat propter similitudinem non in primis qualitatis, sed in illis accidentibus, quae consequuntur substantiae modum, qui rauscit ex modo mixtionis, ut sunt color, crassities, tenuitas, friabilitas & tales aliae qualitates, quae sunt magis ex parte materiae. Non, inquam, rei difficiatis satisfit, propterea quod haec operatio purgantium longe nobilibus sit, quam ut a modo substantiae tali deduci queat, utpote qui mutari potest, vi purgatrice nihilominus remanente, quod infusionibus, extractionibus, decoctionibus si-milibus apparet». F. Valles, Controversiarum medicarum etphilosophicarum libri decern, Com-pluti, exofficina Ioannis Brocarii, 1556, pp. 145f.

35. According to this theory, the degree of acrimony, bitterness and tenuity indicates the strength of a drug. Weak drugs only evacuate yellow bile, stronger ones phlegm, and the strongest also black bile. Horst, op. cit., note 10 above, p. 362: «Non sequitur, quod monet Dorncreilius tr. de purg. cap. I. quod purgantia, quoacrioraettenuiora fuerint, eo quoque humores crassiores & in par-ibus remotiores existentes evacuent, ita ut phama minus acria et amartudine fere carentia bilem duntaxat evasit attrahant, his acirora et tenuiora prompte putitam eliciant; succum vero melancholicum non nisi illia, quae cum vehementi acredine insiginem amartudinem obtineant...» T. Dorncreilius, Dispensarium novum... cui... accessit eiusdem auctoris Tractatus De purgatione utilissimus, Hamburgi, Exbilbiophilo Frobeniano, 1604, p.120f.

36. Horst, op.cit.,note 10above, p. 364: «Imocoloris etiam in promovenda purgatione magnum activi-tatem esse non negamus... quatenus omnis vitalis actio, & per consequens etiam superfluorum excretio, caloris adunuo perficetur, inprimis ubi tenuitas substantiae, amarties, acrimonia & similia accedunt...»

37. On Mesue, see Lieberknecht, note 3 above, pp. 4-8.

38. Horst, op.cit., note 10 above, p. 363: «Hanc occultam proprietatem agendi Mesue sub inst. canon Vnivers; theor. 1. a coelo medicamento communicatum statuit, ita tamen, quod monet Mondinus, inaddition., utcomplexiostrincipium praeparativum deserviens specificae formae, quoad illam operationem : ad hoc facilliime cum Hippocr. assertione conciliatur, quatenus de Mesue, ut inquit Costaeus in additioni. ad hunc locum, non estamirandum, quod medicamentum quatenus tale, id est formae gratia, quae propecto rei cuique largitur, ut hoc ipsum sit, quod quaeque est &coelestivi, quae impartiturformas,purgandi vires obtinere medicamenta profitetur». Mesue, Opera de medicamentorum purgantium defectu, castigatione, et usu libri duo... Cum Mundini, Honesti, Manardi, et Sylvii in tres priores libros observationibus... Atque item Ioannis Costaei Annotationes, Venetiis, Juntae, 1589, pp1 bf., 3a.

39. Horst, op. cit., note 10 above, p. 363f.: «Est enim occulta proprietates nihil aliud, quam similitudo substantiae, qua medicamentum cum homore expurgando convenit, cujus ratione medicamentum agit & humor patitur, illudque sibi familiarem succum trahit, hinc vero trahenti pharmaco cedit, quod fit ea ratione, quatenus medicamentum purgans a calorenativactu, cujus resoluti vapore et spiritus in totum corpus disperguntur, qui postea vi appropriata totius substantiae sibi familiares humores attrahunt & a reliquis separant, ubi natura tarn a noxis humoribus, quam ipsius medicamentum qualitatibus alienis extimulata facultatem expultricem excitat, ut una cum medicamento purgante simul etiam peccantem homorem expellat».

40. Ibid, p. 364: «Fallopio de simplici cap. 4 ejusmodi similitudinem substantiae consistere dicit in natura quadam corpore, quae non sit ipsa forma, sed habeat tale temperamentum, quod parum distet atemperamento illius, quod attrahitur, quae ratione diversa phrakhendi principia uni eodem medicamento concedi possunt, quod sano sensu approbamus».

41. Falloppio, Opera quae adhuc extant omnia, in unum congeta, Francofurti, Apud haeredes Andreae Wecheli, 1584, pp. 32f. Seeing simili-tude of substance and form as equivalent for the explanation of drug action, as stated by Fernel, is rejected by Falloppio who criticizes Fernel by name.

Biography

Christoph Schweikardt obtained a medical doctorate at Giessen University in 1996 and a M.A. degree in History at Leiden university in 1997. Currently, he holds an assistant position at the Institut fur Geschichte der Medizin in Halle/Saale, Germany.