

1 **A comprehensive discernment of the pathogenesis of atherosclerosis based** 2 **on the Gurvadi Guna**

3

4 **Abstract:**

5 Pure science is one academic discipline that derives new knowledge from scientific
6 experiments. This includes Physics, Chemistry and Biology. The main goal of pure science is
7 to develop theories that establish the relations between the phenomena of the universe. These
8 developed theories possess some properties or Guna through which one can understand the
9 concepts. As explained by Ayurveda, Guna (Properties) is one among the Shadpadartha (Six
10 Padarthas). Ayurveda accepts 41 properties, of which 20 are the Gurvadi Guna (Heaviness,
11 etc). This Gurvadi Guna has a major role in clinical practice, especially in the manifestation
12 of Vyadhi (Disease) and the Chikitsa (Treatment). Atherosclerosis is a disease where arteries
13 change their properties due to the deposition of Fats and cholesterols in their walls.
14 Understanding the process of manifestation of the disease is given prime importance in
15 Ayurveda to treat it. Hence one should understand the pathogenesis at the Guna level to plan
16 the proper treatment. Basic concepts of pure science and Gurvadi Guna having similar actions
17 are compared and an attempt is made to establish the relationship between Gurvadi Guna and
18 basic concepts of pure science in the manifestation of atherosclerosis. Guna is inferred
19 through the Karma (Action). Most of the basic concepts of pure science are the measuring
20 parameters that have their properties in causing the action. Discerning atherosclerosis through
21 the basic concepts of pure science is the stepping stone to the plan of treatment protocols
22 based on the Gurvadi Guna.

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24 **Keywords:** Gurvadi Guna, Basic Concepts, Pure Science, Atherosclerosis.

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28 Introduction:

29 Pure science is one academic discipline that derives new knowledge from scientific
30 experiments. This includes Physics, Chemistry and Biology. Physics deals with fundamental
31 principles of nature including motion, forces, waves and energy. Chemistry focuses on the
32 composition, structure, and reactions of the elements. Biology involves the study of living
33 organisms, their structure, function, and growth etc. The main goal of pure science is
34 developing the theories establishing the relations between the phenomena of the universe.
35 These developed theories possess some properties through which one can understand the
36 concepts. Guna (Properties) is one among the Shadpadartha (Six Padarthas) explained in
37 Ayurveda. Ayurveda accepts 41 Guna. Namely 5 Vishesha Guna, 20 Gurvadi Guna, 6 Atma
38 Guna and 10 Paradi Guna.^[1] These Vimshati Gurvadi Guna (Heaviness etc 20 properties)
39 are called Sharira Guna (Properties related to the body) which helps in understanding the
40 physiology as well as the pathology of the body.^[2] Atherosclerosis is one such disease where
41 arteries change their properties due to the deposition of Fats and cholesterols in their walls.
42 Understanding the process of manifestation of the disease is given prime importance in
43 Ayurveda to treat it. Hence one should discern the pathogenesis at the Guna level to plan the
44 proper Chikitsa (Treatment).

45 Need for the study:

46 Gurvadi Guna are essential in understanding disease pathogenesis by analysing how
47 substances influence the body's mechanism. When it is integrated with basic science, these

48 Guna fit in the principles of basic science as well. Understanding these properties enables
49 targeted dietary and lifestyle modifications in lifestyle disorders, promoting balance and
50 preventing diseases. In today's era of atherosclerosis, this approach bridges traditional
51 wisdom with scientific insights. It supports not only symptom management but also addresses
52 the root causes of the diseases. Thus, Gurvadi Guna remains a tool for holistic and preventive
53 healthcare. Hence for the proper diagnosis and effective treatment along with the preventive
54 perspective of the disease, understanding the concept of Gurvadi Guna is essential.

55 **Aims and Objectives:**

- 56 • To understand the pathogenesis of atherosclerosis through the concept of
57 Gurvadi Guna and concepts of pure science.

58 **Sources of information:**

59 A comprehensive literature research was conducted to gather information from
60 different resources. The review was carried out using classical and contemporary texts such
61 as Charaka Samhita, Sushruta Samhita and Ashtanga Hridaya, Text Book of Padartha
62 Vijnana evam Ayurveda Itihasa, Padartha Jijnasa, Textbook of Pathology and various peer-
63 reviewed journals and Websites.

64 **Methodology:**

- 65 ➤ Step 1: Information regarding the fundamental principles of pure science is collected.
- 66 ➤ Step 2: Literatures available on the Gurvadi Guna are compiled from Ayurveda texts.
- 67 ➤ Step 3: Causes and Pathogenesis of the atherosclerosis is reviewed from the Textbooks
68 of pathology and various peer reviewed journals.
- 69 ➤ Step 4: A comparison of the Gurvadi Guna with concepts of pure science is carried out.

70 ➤ Step 5: Gurvadi Guna and concepts of pure science are analysed in discerning the
71 pathogenesis of atherosclerosis.

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74 **Review of Literature:**

75 Pure science is also known as Basic science or Fundamental science which deals with
76 the study of natural phenomena through observation, and experimentation using scientific
77 methods to establish theories. It helps to understand the universe through scientific
78 experiments. Physics, Chemistry, and Biology are some examples of pure science. The main
79 goal of pure science is to gain knowledge in a particular field regardless of how it is
80 ultimately used. Pure science widens the understanding of the phenomenon in the scientific
81 field by creating curiosity about the properties of the concepts.^[3]

82 Guna or the attributes are one among the Shadkarana (Six reasons) explained in
83 Ayurveda. It is the base of the selection of a drug or food. Hence it is mentioned after the
84 Dravya(Object).^[4] That which attracts is called Guna.^[5] Vaisheshika Darshana defines the
85 Guna as that which resides in the Dravya expecting Karma (Action) to happen and itself
86 having no Guna. Gurvadi Guna are obtained from the Parthivadi Dravya (Earth etc 5 basic
87 elements) which mainly focuses on the physical properties of the substances found in the
88 body and around.^[6] Inferences of these 20 Guna are possible through their action by the
89 Dravya.^[7] Hence understanding the physiology as well as the pathology of the body from the
90 perspective of Gurvadi Guna has a major role in planning the treatment. These Twenty Guna
91 are also called Dwandwa Guna as their actions are opposite to one another.^[8] Guna and their
92 Karma are given as mentioned in Table 1.

93 Table 1: 20 Gurvadi Guna with their Karma^[9]

Sl. No.	Guna	Karma
1	Guru (Heavy) Laghu (Light)	Brimhana (Nourishing) Langhana (Depleting)
2	Manda(Slow) Teekshna(Fast)	Shamana(Palliating) Shodhana(Purification)
3	Hima(Cold) Ushna(Hot)	Stambhana(Stasis) Swedana(Sudation)
4	Snigdha(Unctuous) Rooksha(Dry)	Keldana(Moistening) Shoshana(Dries)
5	Shlakshna(Smooth) Khara(Rough)	Ropana(Healing) Lekhana(Scraping)
6	Sandra(Concentrated) Drava(Diluted)	Prasadana(Gathering) Vilodana(Spreading)
7	Mridu(Soft) Kathina(Hard)	Shlathana(loosening) Drideekarana(Compactness)
8	Sthira(Stable) Sara(Mobile)	Dharana(Capacity of bearing) Prerana(Propagating)
9	Sookshma(Minute)	Vivarana(Capacity to open)

	Sthoola(Gross)	Samvarana(Obliterates the channels)
10	Vishada(Clear) Picchila(Slimy)	Kshalana(Cleansing) Lepana(Coating)

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95 Atherosclerosis is a chronic inflammatory progressive disease of arteries
96 characterized by the accumulation of low-density lipoprotein and remnant lipoprotein
97 particles in focal areas of arteries particularly at regions of disturbed non-laminar flow at
98 branch points in the arteries.^[10] It is a primary cause of atherosclerotic cardiovascular
99 diseases resulting in heart attacks, stroke, peripheral arterial disease etc.^[11] It is widely
100 prevalent in industrialized countries. Atherosclerosis can develop as a result of four main risk
101 factors: smoking, diabetes mellitus, hypertension, and dyslipidaemia.^[12]

102 Manifestation of atherosclerosis is a multifactorial process whose exact pathogenesis
103 is still not known. Since the time of Virchow, several theories have been proposed. A
104 sedentary lifestyle with increased Blood pressure, Diabetes mellitus, and Smoking
105 aetiological factors leads to endothelial dysfunction and injury.^[13] Chronic injury in the
106 intima layer of muscular arteries produces an inflammation response. Lipid molecules,
107 macrophages, and other fibrous components build up in the walls of arteries as a result of
108 chronic inflammation. These accumulated materials change and form the plaques. Thin
109 fibrous capping and a higher concentration of inflammatory cells are characteristics of
110 vulnerable plaques. Additionally, the blood arteries undergo remodelling with compensatory
111 expansion, increased diameter, decreased flexibility, and ultimately narrowing lumen, which
112 leads to the development of atherosclerosis.^[14]

113 Combining the traditional concepts of Gurvadi Guna with scientific principles is key
114 to discerning disease pathogenesis in the modern era. This integration is essential for
115 improving our knowledge of disease mechanisms in contemporary healthcare. Gurvadi Guna
116 which describes the fundamental attributes serves as a foundational framework for assessing
117 the physiological balance within the body. A more holistic approach to diagnosis and
118 treatment can be developed by synthesizing these ancient concepts with current scientific
119 insights from the fields of physics, chemistry and biology. This integration offers a deeper
120 understanding of how imbalances in the elemental qualities of the body may influence
121 cellular and systemic functions, providing clarity in the pathophysiology of chronic diseases.
122 The convergence of the principles of Ayurveda with scientific research holds the potential for
123 more individualized, effective, and preventive therapeutic strategies. Ultimately, this
124 approach fosters the development of a personalized healthcare model that bridges the gap
125 between traditional knowledge and contemporary medicine.

126 **Discussion:**

127 The concepts presented in fundamental science align closely with the principles of
128 Gurvadi Guna and its corresponding actions, highlighting their similarities. Guru-Laghu
129 Guna may be compared with the 'mass' as heaviness is the main point to be understood. The
130 term Manda generally refers to slowing down and can be compared to 'slow chemical
131 reactions', while Teekshna corresponds to 'fast chemical reactions', illustrating the contrast
132 between the two Guna. Hima and Ushna are the Guna which depict the 'temperature' or the
133 'thermodynamics' entity of pure science. Snigdha-Rooksha Guna softens or dries up the
134 subject. It can be compared with the 'Fats' concept of pure science.

135 Comparing the Gurvadi Guna with concepts of Fundamental science are given in
136 Table 02.

137 Table 02: Probable comparison of Gurvadi Guna with the concepts of pure science.

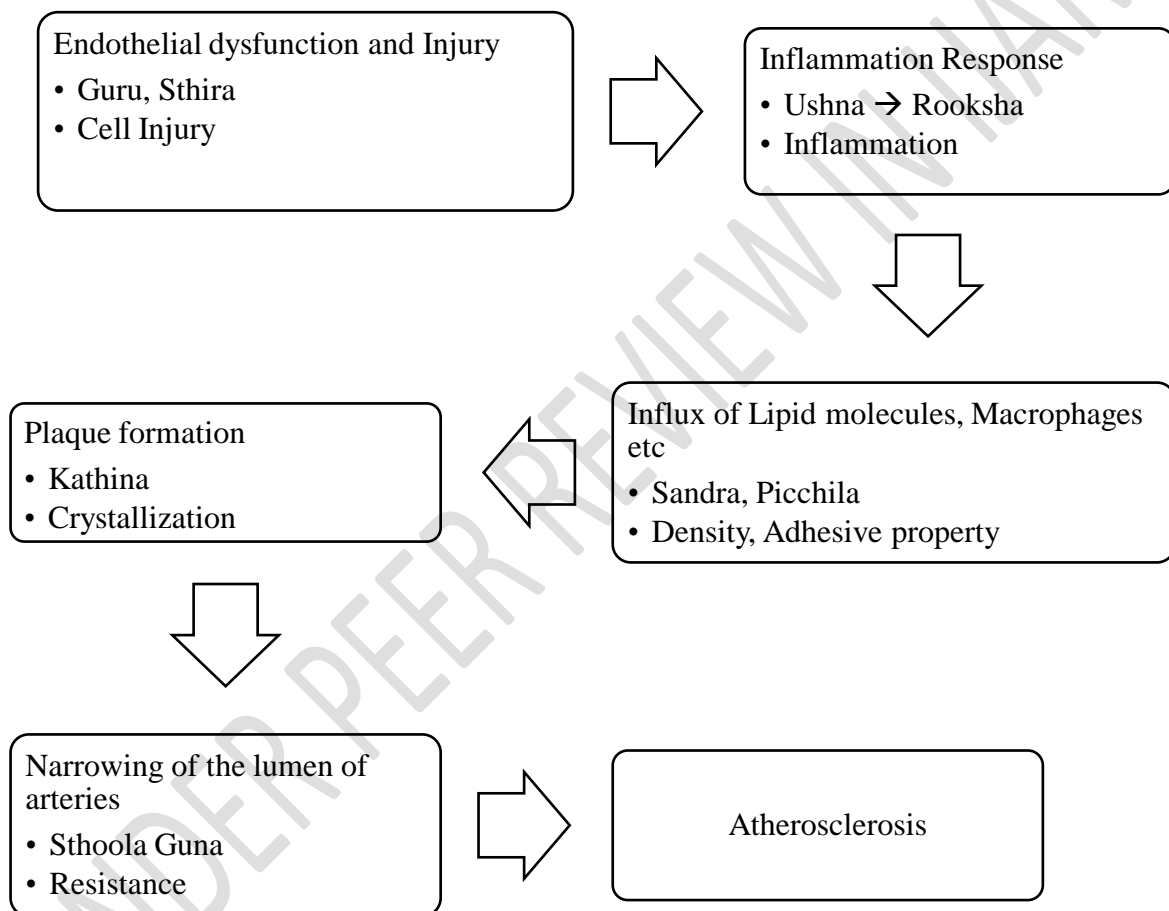
Sl. No.	Guna	Probable comparison of the concepts of pure science
1	Guru – Laghu	Mass
2	Manda – Teekshna	Chemical Reactions
3	Hima – Ushna	Temperature, Thermodynamics
4	Snigdha – Rooksha	Fats
5	Shlakshna – Khara	Friction
6	Sandra – Drava	Density, Viscosity
7	Mridu – Kathina	Crystallization
8	Sthira – Sara	Velocity
9	Sookshma - Sthoola	Resistance
10	Vishada - Picchila	Adhesiveness

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139 In the pathogenesis of atherosclerosis, lipid molecules are having guru, Sthira Guna
140 which obstructs the blood flow in the arteries causing endothelial injury. Whenever the cell
141 injury happens in the body, some secretions are produced like cytokines, chemokines etc as
142 an inflammation response by which Ushna Guna can be inferred. As a response to these
143 secretions, the body tries to desiccate it with the help of Rooksha Guna. Due to the chronicity
144 of this process dried particles along with the lipids and other substances infiltrate into the
145 wall of arteries. The influx process where density increases in a particular area of the artery
146 can be compared with Lepana karma by which one can discern the Picchila and Sandra Guna.
147 Further, these substances undergo plaque formation where crystallization of the particle starts

148 because of the Kathina Guna. Plaques obstruct the blood flow in the artery through the
 149 Sthoola Guna which results in the narrowing of the lumen resulting in Atherosclerosis.

150 Signs and Symptoms of Atherosclerosis are seen only when the accumulated particles
 151 dislodge due to Vishada and Chala Guna. According to the location of dislodgement
 152 emergencies like Angina pectoris, Myocardial infarction, And Transient ischemic attacks can
 153 be manifested in the person.



154 Gurvadi Guna and the Concept of pure science can be understood in the pathogenesis
 155 of Atherosclerosis as mentioned in Figure 01.

156 Figure 01: Interpretation of Gurvadi Guna and Concept of Basic Science in the Pathogenesis
 157 of Atherosclerosis

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159 Thus the obstruction of blood flow is influenced by various Guna like Guru, Sthira,
 160 and Picchila leading to endothelial injury and chronic inflammation. The body's response

161 through Ushna and Rooksha Guna contributes to the desiccation and infiltration of particles
162 into the arterial walls. Over time, plaque formation occurs due to Kathina Guna and Sthoola
163 Guna causing the narrowing of the arteries. The condition remains asymptomatic until
164 dislodged particles, influenced by Vishada and Chala Gunas, lead to severe complications.

165 To effectively plan the treatment for atherosclerosis, it is essential to use Dravya
166 which possesses Sookshma, Vishada, and Sara Guna which help in either the Shodhana or
167 Shamana line of treatment. Sneha Dravya (Unctuous substances) processed with these
168 properties enhances flexibility and promotes better circulation by widening the diameter of
169 blood vessels. This in turn helps to reduce arterial stiffness and improve blood flow. Regular
170 use of such Sneha Dravya can aid in the prevention of plaque accumulation and ensure
171 optimal vascular function, thereby mitigating the risk of complications associated with
172 atherosclerosis.

173 **Conclusion:**

174 Guna plays a crucial role in the pathogenesis of atherosclerosis. These Guna reflect
175 the accumulation of excess fat which obstructs the normal flow of circulation, leading to
176 hardened, narrowed arteries. The heaviness and stagnation caused by these imbalances are the
177 major cause of the development of atherosclerosis. To treat this condition, treatments that
178 possess the opposite Guna such as Sookshma, Vishada, Sara etc to counteract the effects of
179 Gurvadi Guna which took place in the manifestation of the atherosclerosis are essential.
180 Additionally, integrating the principles of pure science, such as an understanding of the
181 molecular mechanisms of atherosclerosis is vital for comprehending its pathogenesis in
182 detail. This fusion of Ayurveda wisdom and modern scientific knowledge leads to a more
183 holistic and effective approach to diagnosing and treating atherosclerosis.

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188 **References:**

- 189 1. Agnivesha. Charaka Samhita. Edition : Acharya JT; editor. Chaukhambha
190 Publications, New Delhi; 2020. 12 p.
- 191 2. Dadu V. Padartha Jijnasa. First Edit. Chaukhambha Classica, Varanasi; 2023. 123 p.
- 192 3. Feibleman JK. Pure Science, Applied Science, Technology, Engineering: An Attempt
193 at Definitions. Technol Cult. 1961;2(4):305.
- 194 4. Agnivesha. Charaka Samhita. Edition : Acharya JT; editor. Chaukhambha
195 Publications, New Delhi; 2020. 7 p.
- 196 5. K, Vidyalakshmi; P.H S. Padartha Vijnana Evam Ayurveda Itihasa. First Edit.
197 Chaukhambha Orientalia Varanasi; 2016. 57 p.
- 198 6. K, Vidyalakshmi; P.H S. Padartha Vijnana Evam Ayurveda Itihasa. First Edit.
199 Chaukhambha Orientalia Varanasi; 2016. 63 p.
- 200 7. Sushruta. Sushruta Samhita. Edition: Re. Acharya, Jadvji Trikamji; Acharya NR,
201 editor. Chaukhambha Sanskrit Sansthan, Varanasi; 2019. 252 p.
- 202 8. Dadu V. Padartha Jijnasa. First Edit. Chaukhambha Classica, Varanasi; 2023. 132 p.
- 203 9. Vagbhata. Ashtanga Hridaya. Edition : Shastri Paradakara HS, editor. Chaukhambha
204 Sanskrit Sansthan, Varanasi; 2020. 12 p.
- 205 10. Mohan H. Textbook of Pathology. Sixth edit. Textbook of Pathology. Jaypee Brothers
206 Medical Publishers (P) Ltd; 2010. 393 p.
- 207 11. Lusic AJ. Atherosclerosis. Nature [Internet]. 2000 Sep 14 [cited 2025 Mar

- 208 17];407(6801):233. Available from:
209 <https://pmc.ncbi.nlm.nih.gov/articles/PMC2826222/>
- 210 12. Mohan H. Textbook of Pathology. Sixth edit. Textbook of Pathology. Jaypee Brothers
211 Medical Publishers (P) Ltd; 2010. 393 p.
- 212 13. Mohan H. Textbook of Pathology. Sixth edit. Textbook of Pathology. Jaypee Brothers
213 Medical Publishers (P) Ltd; 2010. 395 p.
- 214 14. Jogi D, Kumar AM, Graduate Scholar P, Professor A, Professor A.
215 UNDERSTANDING MARGAVARANA THROUGH CONTEMPORARY
216 SCIENCE: AN INTEGRATIVE EXPLORATION. Int J Nov Res Dev [Internet]. 2024
217 [cited 2025 Mar 17];9(4):e867–72. Available from:
218 <https://ijnrd.org/viewpaperforall.php?paper=IJNRD2404489>

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