

A Novel Ophthalmic Stent Designed to Improve Choroidal Perfusion in Geographic Atrophy: A Proposal for Future Research

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INTRODUCTION



Geographic atrophy (GA), the advanced form of dry age-related macular degeneration (AMD), continues to progress despite emerging anti-VEGF and complement-based therapies.



Although pharmacological treatments may slow lesion enlargement, there remains no intervention that restores physiological perfusion to the outer retina.



We have developed a novel ophthalmic arterial stent, designed to improve blood flow to the macular region by optimising choroidal perfusion.

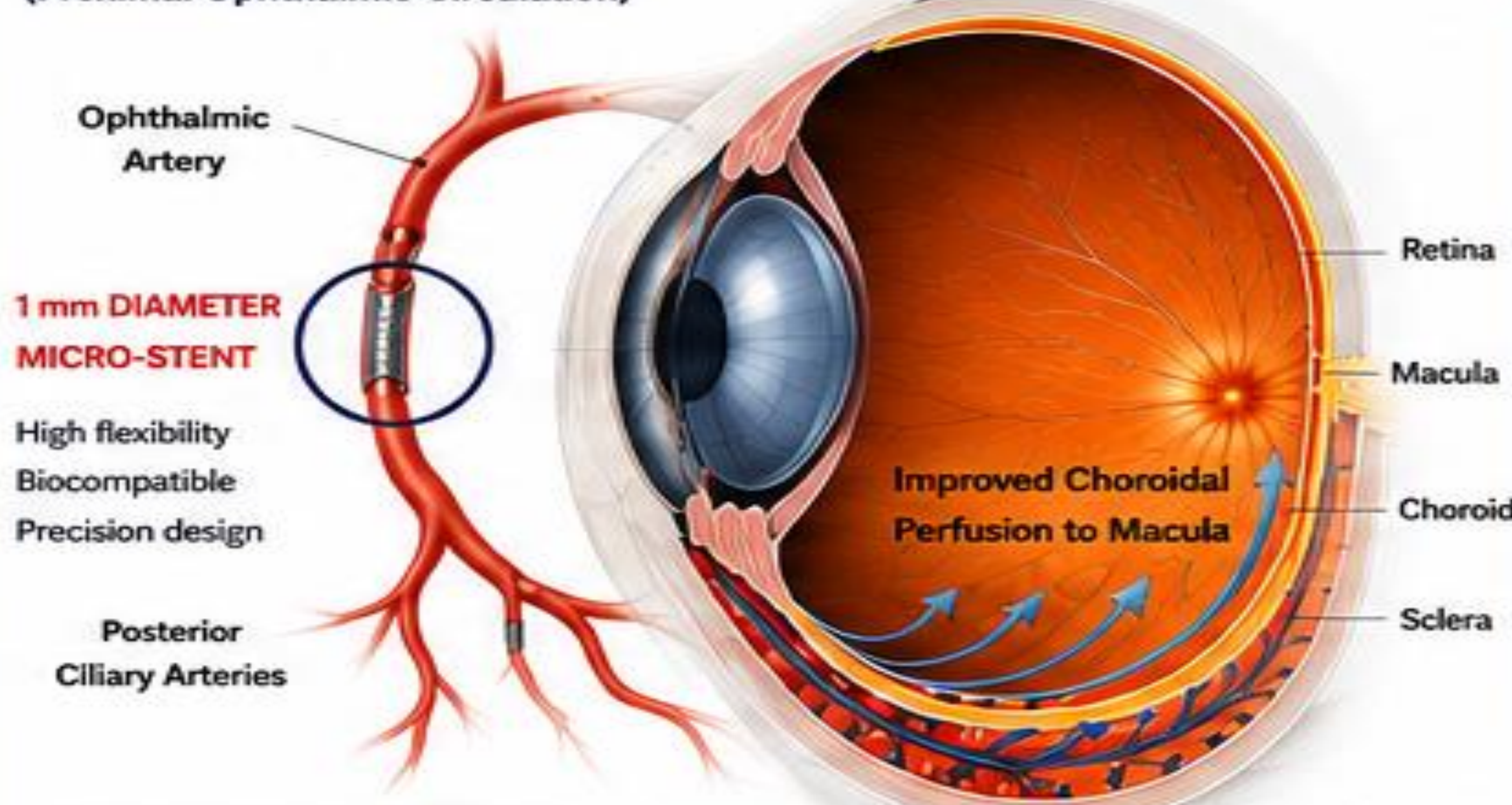


This concept originates from the recognition that impaired choroidal circulation may contribute to disease progression.

This abstract outlines a research proposal to investigate the safety, feasibility, and potential therapeutic impact of targeted ophthalmic stenting in patients with GA.

CONCEPT: ENHANCED CHOROIDAL PERFUSION THROUGH OPHTHALMIC STENTING

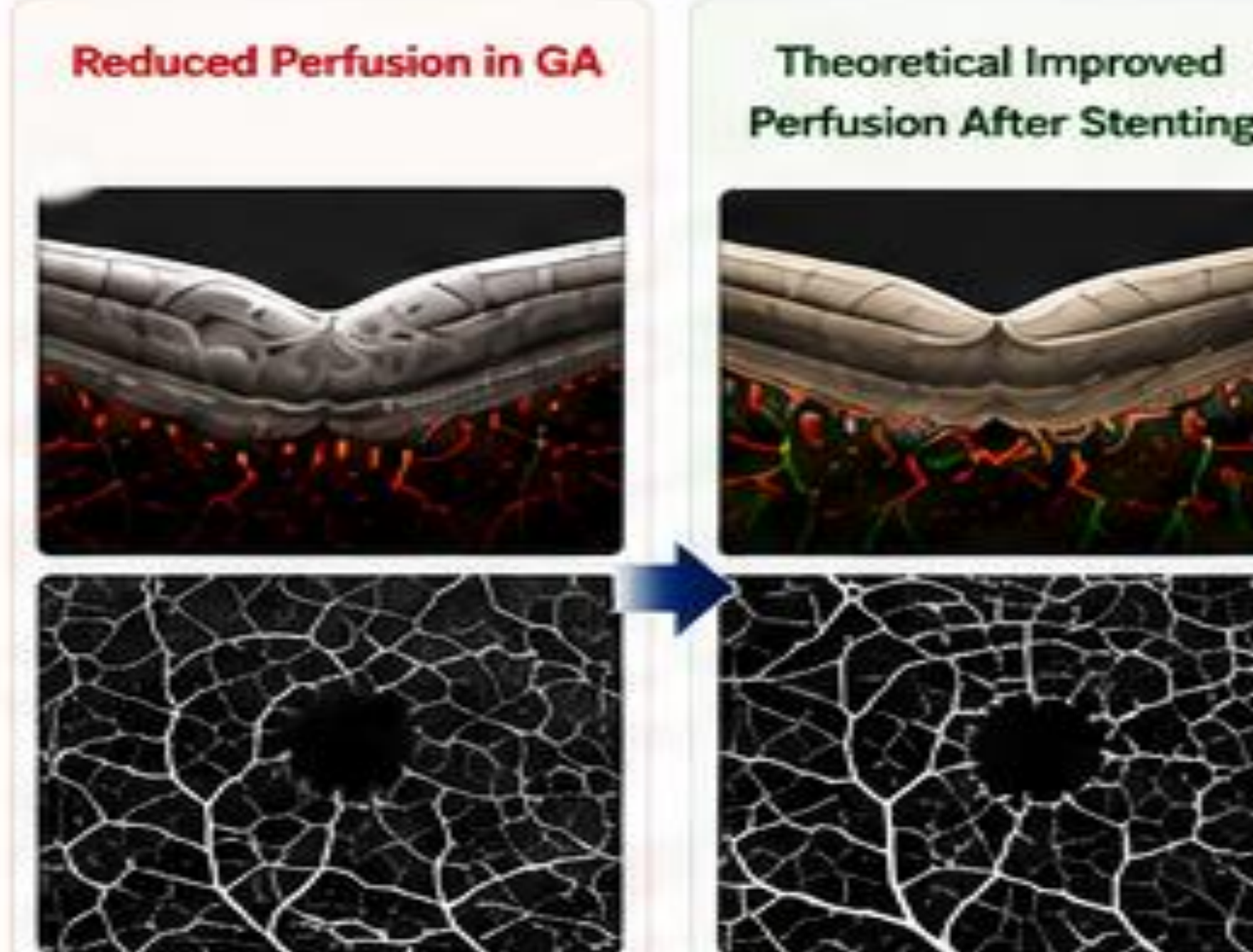
OPHTHALMIC MICRO-STENT PLACEMENT (Proximal Ophthalmic Circulation)



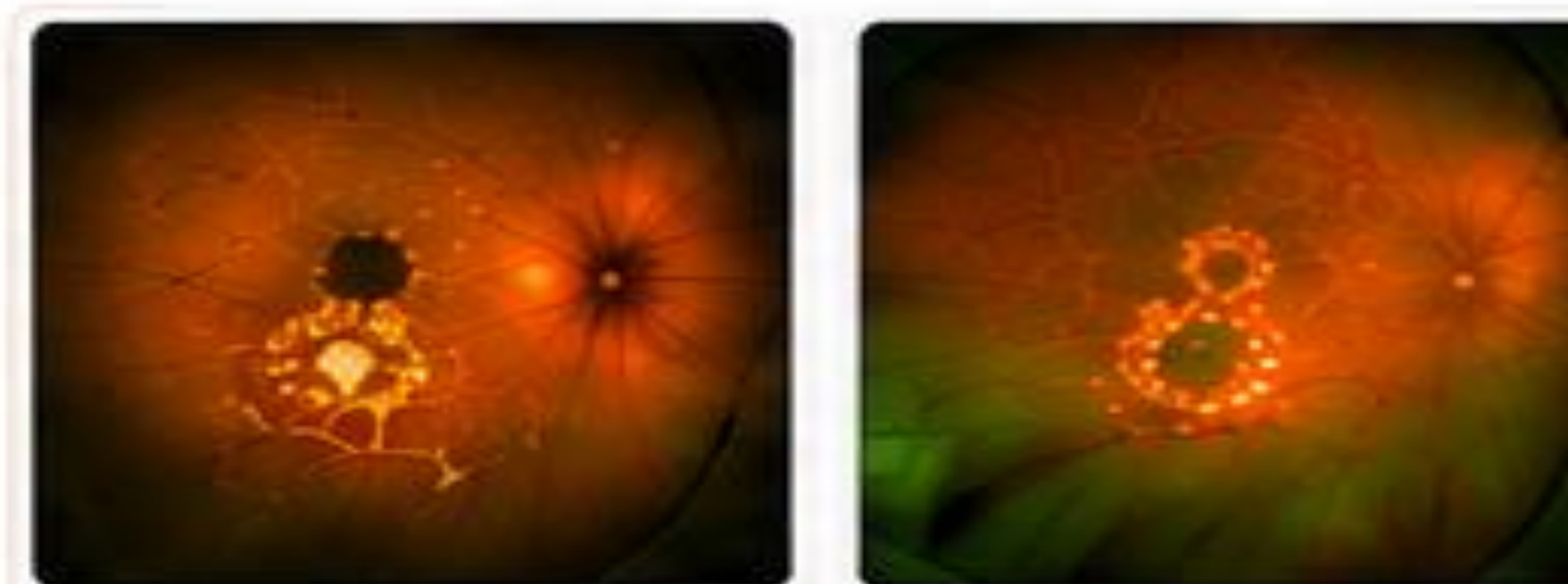
1 mm DIAMETER STENT – KEY FEATURES

- ✓ Ultra-small profile (1 mm diameter)
- ✓ Designed for ophthalmic arterial circulation
- ✓ Optimised to improve blood flow
- ✓ Minimal vessel wall trauma
- ✓ Potential to enhance macular perfusion

CHOROIDAL PERFUSION COMPARISON



OCTA – CHORIOCAPILLARIS FLOW



WIDEFIELD IMAGING

PROPOSED RESEARCH STRATEGY

1

Pre-clinical Validation

Mechanical safety, flow dynamics, and anatomical compatibility using ocular vascular models.



2

Development of Clinical Pathways

Criteria for GA patient identification, multimodal imaging protocols (OCT, OCTA, widefield imaging), and perfusion-based risk stratification.



3

Pilot Feasibility Study

Evaluate stent deployment in carefully selected GA patients to assess vascular flow enhancement using OCTA and functional retinal measures.



4

Comparative Evaluation

Compare GA progression rates in stented vs non-stented high-risk patients, with particular attention to whether improved perfusion reduces lesion enlargement.



ANTICIPATED / PROPOSED OUTCOMES

As this is a proposal, no clinical results are yet available. We anticipate that improved ophthalmic arterial perfusion may:



Enhance choroidal blood flow to the macular region



Reduce metabolic stress in the outer retina



Slow the radial expansion of GA lesions



Complement existing pharmacological therapies rather than replace them

These outcomes will be tested in future clinical studies. As this remains an early-stage conceptual project, no experimental results are available. The anticipated outcome is feasibility data, modelling outputs, and safety analyses to determine whether further preclinical development is scientifically justified.

RECENT ADVANCES IN BLOOD FLOW STUDIES IN GA

OCTA BIOMARKERS



Increasing use of OCTA to detect choriocapillaris loss, vascular drop-out and flow deficits associated with GA progression.

(Ophthalmology 2023; 130: 1532–1544)

AI-DRIVEN PERFUSION ANALYSIS



Emerging AI tools quantify retinal and choroidal perfusion abnormalities and predict GA progression.

(Br J Ophthalmol 2024; 108: 1020–1028)

BEYOND ANTI-COMPLEMENT THERAPY



Growing interest in complementary approaches including regenerative and vascular-supportive strategies in GA research.

(Prog Retin Eye Res 2024; 95: 101118)

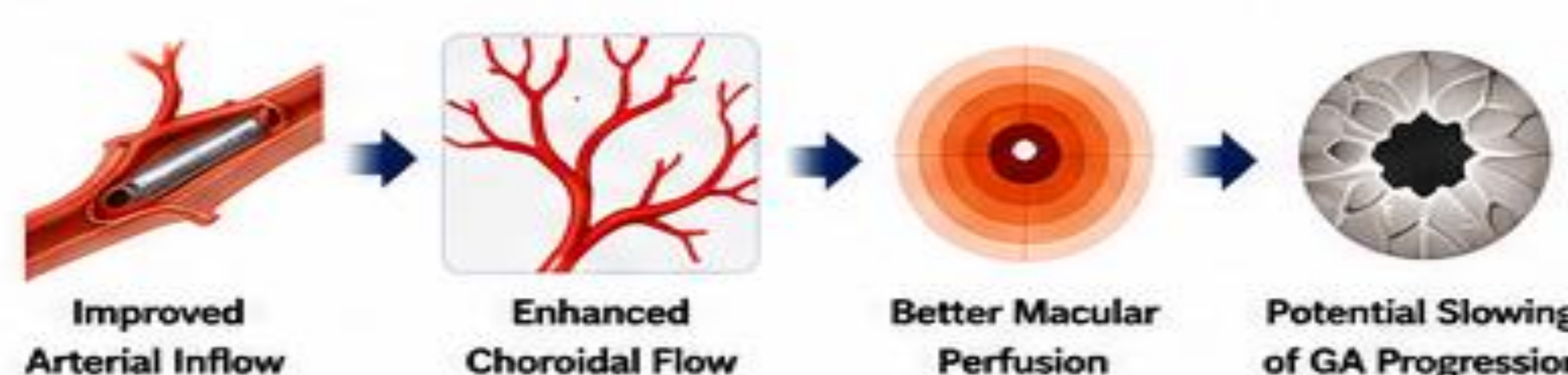
PERFUSION & METABOLISM



Evidence linking impaired choroidal perfusion with hypoxia, inflammation and outer retinal degeneration in GA.

(Exp Eye Res 2023; 228: 109427)

PERFUSION-ORIENTED THERAPY CONCEPT



EXPLORATORY RESEARCH CONCEPT

Safety • Feasibility • Perfusion • Progression

CONCLUSION

This proposal introduces a novel ophthalmic micro-stent concept intended to stimulate academic inquiry into perfusion-oriented strategies for GA. The work remains entirely preclinical and exploratory. Its purpose is to establish a structured investigative pathway, ensuring that any potential future development proceeds within the appropriate scientific, ethical, and regulatory frameworks. The concept represents a possible direction for innovation aimed at expanding the therapeutic landscape for GA, subject to rigorous validation.

AUTHOR & DISCLOSURE INFORMATION

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Case Report	No