

# AU InforMed

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## Key Inforbits

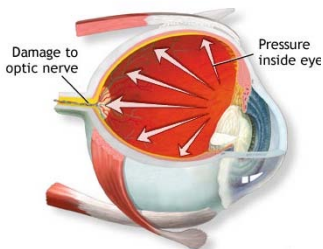
- Glaucoma Facts
- Pharmacologic Therapy
- Glaucoma Surgery
- Alternative Therapy: Medical Marijuana
- Eye Drop Tips
- *Latisse*<sup>®</sup>

# Glaucoma Awareness Month



## Glaucoma Facts

- Glaucoma is a collection of ocular disorders that leads to optic disk changes resulting in loss of visual sensitivity and visual field. The underlying causes of glaucoma range from developmental abnormalities in the eye, scarring due to trauma or infection, as well as inability of the aqueous humor to drain properly.<sup>1,2,3</sup>
- Risk factors for developing glaucoma include older age, positive family history, African-American, systemic hypertension, diabetes, cardiovascular disease, and myopia.<sup>1,2</sup>
- Glaucoma should be suspected if a patient presents with visual field deficits, abnormal optic disk on fundoscopy, or increased intraocular pressure (IOP).<sup>1</sup>
- Two types of glaucoma: open- and closed-angle glaucoma. Open-angle glaucoma occurs when fluid outflow is inadequate despite no obstruction, while in closed-angle glaucoma there is a distortion of the iris that prevents fluid outflow.<sup>1,2,3</sup>
- Primary glaucoma occurs when there is no identifiable cause, while in secondary glaucoma a cause can be identified.



Available from:  
[www.nlm.nih.gov/.../ency/ima/pepages/9349.htm](http://www.nlm.nih.gov/.../ency/ima/pepages/9349.htm)

## Did you know?

- Not all patients with glaucoma experience elevated IOP. In fact, 1/3 of patients have normal IOPs. Normal IOP ranges from 11-21 mmHg. Patients with severe glaucoma may have IOPs >80 mmHg.<sup>1</sup>
- Glaucoma is the 2<sup>nd</sup> most common cause of blindness in the US and the leading cause of blindness in African-American and Hispanic-Americans.<sup>1,3</sup>
- 3 million Americans are affected and of those affected only 50% are aware they have glaucoma.<sup>1,3</sup>
- Glaucoma can affect individuals of every age. However, individuals >60 years old have 6 times the risk of those <60 years of age.<sup>1</sup>
- All individuals >40 years of age should receive a comprehensive eye exam every 1-2 years.<sup>1,2,3</sup>
- Patients with glaucoma often complain of difficulty driving, parts of words missing while reading, or missing a stair while walking.<sup>1</sup>

## Looking through the eyes of glaucoma:



Available from:

[http://www.metwesteyecentre.com.au/Images/Image/new/s/watery/Glaucoma\\_adv.jpg](http://www.metwesteyecentre.com.au/Images/Image/new/s/watery/Glaucoma_adv.jpg)

1. Beers MH, Porter RS, et al. The Merck Manual of Diagnosis and Therapy: 18<sup>th</sup> ed. Whitehouse Station, NJ: Merck Research Laboratories; c2006: 903-10.
2. Fiscella RG, Lesar TS, Edward DP. Glaucoma. In: DiPiro JT, Talbert RL, Matzke GR, Wells BG, Posey LM, editors. Pharmacotherapy: A pathophysiologic approach. 7<sup>th</sup> ed. New York: McGraw-Hill Medical; c2008. P.1551-64.
3. The Glaucoma Foundation [internet]. New York, NY; c2009 [cited 2009 Dec 8]. Available from: <http://www.glaucomafoundation.org/>

## Selected Topical Pharmacologic Treatment of Glaucoma<sup>1,2,3</sup>

Drug Class	Drug Names	Mechanism	Effect on Aqueous Humor	Usual Daily Dose	ADR's
$\alpha$ -agonist	Iopidine® (apriclonidine) Alphagan® (brimonidine)	$\alpha$ 2 mimetic on ciliary body and uveosacral canal	↓ production and ↑ outflow	1 drop 2-3 times/day	<u>Local:</u> Lid edema, itching, eye discomfort <u>Systemic:</u> Dizziness, fatigue, dry mouth, ↓ BP
$\beta$ -blockers	Betoptic® (betaxolol) Betagan® (levobunolol) Optipranolol® (metipranolol) Timoptic (timolol)	$\beta$ blockade on ciliary body	↓ production	1 drop twice/day	<u>Local:</u> Stinging, dry eyes, conjunctivitis, blurred vision <u>Systemic:</u> ↓ HR, BP, bronchospasm
Carbonic Anhydrase Inhibitors	Azopt® (brinzolamide) Trusopt® (dorzolamide)	Block sodium and bicarbonate ions from ciliary body	↓ secretion	1 drop 2-4 times/day	<u>Local:</u> Stinging, tearing, blurred vision, photophobia
Prostaglandin analogues	Travatan® (travoprost) Lumigan® (bimatoprost) Xalatan® (latanoprost)	↑ outflow through uveosacral and trabecular meshwork	↑ outflow	1 drop every night	<u>Local:</u> Altered iris, lid, and lash pigmentation, ↑ lash growth
Cholinergic agonist	Carpine® (pilocarpine) Carboptic® (carbachol)	Contraction of iris sphincter muscle	↑ outflow, ↓ inflow	1 drop 2-3 times/day	<u>Local:</u> Miosis, ↓ night vision, eyelid twitching, brow ache <u>Systemic:</u> N/V, bronchospasm, ↑ urinary frequency

1. Dipro JT, Talbert RL, Yee GC, Matzke GR, editors. Pharmacotherapy; A Pathophysiologic Approach. 7<sup>th</sup> Edition. New York: McGraw Hill Medical Publishing Division; 2008: 1551-1564
2. DRUGDEX® System [AUHSOP intranet database]. Version 5.1 Greenwood Village, CO: Thomson Reuters (Healthcare) Inc. [Updated 2009]. [about 15 p.] Available from: <http://www.thomsonhc.com>
3. Lexi-Comp Online. Electronic edition. Hudson (OH): Lexi-Comp Inc, modified periodically,] Accessed 2009 Dec 8. Available from: <http://online.lexi.com/crlsq/servlet/crlonline>

### Glaucoma Surgery

Surgery is an alternative for patients that do not respond to drug therapy or cannot tolerate medication.<sup>1</sup> The type of surgery performed is dependent on whether a patient has open-angle or closed-angle glaucoma as well as whether the glaucoma is acute or chronic. Surgical intervention may be 1<sup>st</sup>-line in patients with extremely high IOP.<sup>1,2,3</sup>

Type of Glaucoma	Surgical Options <sup>1</sup>
Open-angle	<p><u>Laser trabeculoplasty</u>—trabecular meshwork is lasered to improve aqueous drainage</p> <ul style="list-style-type: none"> <li>• Argon laser trabeculoplasty (ALT)—effective, but ½ of patients require additional therapy or surgery within 2-5 years</li> <li>• Selective laser trabeculoplasty (SLT)—equally effective as ALT initially but greater effectiveness with further treatments</li> </ul> <p><u>Guarded filtration procedure</u>—hole placed in scleral flap to form a filtration bleb. Patients have ↑ risk of endophthalmitis after procedure.</p>
Primary angle-closure	<u>Laser periphery iridotomy</u> —definitive treatment. Allows passage of fluid from posterior to anterior chamber. Risk of diplopia.
Chronic angle-closure	<i>Same options as open-angle</i>

1. Beers MH, Porter RS, et al. The Merck Manual of Diagnosis and Therapy: 18<sup>th</sup> ed. Whitehouse Station, NJ: Merck Research Laboratories; c2006: 903-10.

2. Fiscella RG, Lesar TS, Edward DP. Glaucoma. In: DiPiro JT, Talbert RL, Matzke GR, Wells BG, Posey LM, editors. *Pharmacotherapy: A pathophysiologic approach*. 7<sup>th</sup> ed. New York: McGraw-Hill Medical; c2008. P.1551-64.
3. The Glaucoma Foundation [internet]. New York, NY; c2009 [cited 2009 Dec 8]. Available from: <http://www.glaucomafoundation.org/>

## Medical Marijuana for Glaucoma: A Review of Available Literature

The active metabolite responsible for the glaucoma benefits is tetrahydrocannabinol (THC).<sup>1</sup>

### Proposed benefit:

- Medical marijuana is thought to decrease intraocular pressure (IOP) by an unknown mechanism.<sup>1</sup> Marijuana (both oral and inhaled) has been shown to reduce IOP by up to 24% in both patients with normal and elevated IOP. The effects of marijuana only last 3-4 hours.<sup>2</sup>

### Proposed Risks:

- Decreased heart rate and blood pressure can result as well as impaired immune system, slurred speech, difficulty concentrating, impaired motor coordination, increased risk of cancer, and emphysema.<sup>1,3</sup>

### Legal status:

- Marijuana is a schedule I narcotic, meaning it is illegal to cultivate, buy, possess, or distribute in all forms. Thirteen states (AK, CA, CO, HI, ME, MI, MT, NV, NM, OR, RI, VT, WA) have medical marijuana use laws that allow doctors and patients to use medical marijuana.<sup>4,5</sup>



Available from:

[http://www.reeferlogic.com/media/blogs/reeferlogic/medical\\_marijuana\\_pill\\_bottle.jpg](http://www.reeferlogic.com/media/blogs/reeferlogic/medical_marijuana_pill_bottle.jpg)

### Summary of evidence:

*Institute of Medicine, National Academy of Sciences. Marijuana and Medicine: Assessing the Science Base. Washington, DC: National Academy Press; 1999.*

- As elevated IOP is a chronic condition needing continuous control, marijuana must be used every 3 hours to effectively treat glaucoma. Data do not support the use of marijuana in the treatment of glaucoma as the potential harmful effects of chronic marijuana smoking outweigh its modest benefits in the treatment of glaucoma.<sup>2</sup>

*American Academy of Ophthalmology Complementary Therapy Task Force. Complementary Therapy Assessment; Marijuana in the Treatment of Glaucoma. American Academy of Ophthalmology. May 2003.*

- An evaluation of National Eye Institute (NEI) sponsored research, Institute of Medicine reviews, and a MEDLINE/EMBASE literature search was performed. The task force concluded that there is no scientific evidence to support increased benefits or decreased risks of marijuana use to treat

glaucoma compared with other agents available.<sup>1</sup>

**Recommendation:** At this time there is not enough evidence to show that marijuana can effectively and safely lower IOP better than other currently marketed glaucoma agents, therefore support of its use in treatment cannot be recommended. Future research comparing available glaucoma agents and marijuana is needed prior to support for the medical use of marijuana in glaucoma.

1. American Academy of Ophthalmology Complementary Therapy Task Force. *Complementary Therapy Assessment; Marijuana in the Treatment of Glaucoma*. American Academy of Ophthalmology. May 2003. [cited Dec 8 2009] Available online from: <http://www.eyecareamerica.org/eyecare/treatment/alternative-therapies/marijuana-glaucoma.cfm>
2. Institute of Medicine, National Academy of Sciences. *Marijuana and Medicine: Assessing the Science Base*. Washington, DC: National Academy Press; 1999. [cited Dec 8 2009] Available online from: <http://www.druglibrary.org/schaffer/LIBRARY/studies/iom/IOMReport.htm>
3. Olsen K. *Poisoning and Drug Overdose*. 5<sup>th</sup> ed. San Francisco: Lange Medical Books/McGraw Hill; c2007 pgs 252-253.
4. State-By-State Medical Marijuana Laws. Marijuana Policy Project. Washington, DC. 2008. [cited Dec 8, 2009] Available online from: [http://www.mpp.org/assets/pdfs/download-materials/SBSR\\_NOV2008\\_1.pdf](http://www.mpp.org/assets/pdfs/download-materials/SBSR_NOV2008_1.pdf)
5. Glaucoma.com [homepage on the Internet] San Francisco: Glaucoma Research Foundation; c2009 [cited Dec 8, 2009]. *Treating Glaucoma* [about 2 screens]. Available from: [http://www.glaucoma.org/treating/medical\\_marijua.php](http://www.glaucoma.org/treating/medical_marijua.php)

### Eye drop tips:<sup>1,2</sup>

1. Wash your hands
2. Tilt your head backward (laying down is the easiest)
3. With index finger pull down on lower lid to gently form a pocket. (Image 1)
4. Let drop of medication fall into pocket and let go of the lower lid. Close your eyes slowly; do not squint or blink.
5. Keep your eyes closed and press gently on the inside corner of the eye-lid for 2 minutes to ensure enough adequate absorption. (image 2)
6. Repeat in other eye.
7. If you use more than one type of eye drop, wait 5-15 minutes before using second eye drop. This will prevent drops from being washed away.

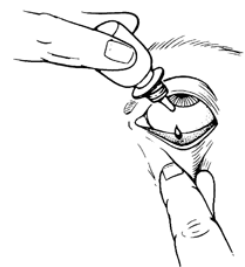


Image 1 available from: [http://www.glaucoma.org/treating/eyedrop\\_tips\\_1.php](http://www.glaucoma.org/treating/eyedrop_tips_1.php)

8. If you are using both drops and ointment, put in the drops before the ointment.
9. Do not touch the dropper tip with the hand or any part of the eye so that it will remain sanitary.

1. Glaucoma.com [homepage on the Internet] San Francisco: Glaucoma Research Foundation; c2009 [cited Dec 8, 2009]. Treating Glaucoma [about 4 screens]. Available from: [http://www.glaucoma.org/treating/medical\\_marijua.php](http://www.glaucoma.org/treating/medical_marijua.php)
2. National Institutes of Health, Clinical Center. Patient Education: How to put eye drops in your eyes. Bethesda, MD: National Institute of Health; 2008 June. [cited Dec 8 2009] Available from: [http://www.cc.nih.gov/ccc/patient\\_education/pepubs/eyedrops.pdf](http://www.cc.nih.gov/ccc/patient_education/pepubs/eyedrops.pdf)

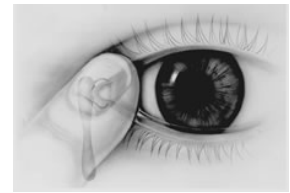


Image 2 available from: <http://www.glaucoma.org>

## **Ooh La Latisse®**

*Want longer, thicker, and darker eyelashes?*

- During clinical trials of the glaucoma ophthalmic solution Lumigan® (bimatoprost), patients were found to have just that. Recently, the FDA has approved *Latisse*® (bimatoprost) for the treatment of hypotrichosis of the eyelashes. Instead of placing drops of a solution into the eye, patients place *Latisse*® on an applicator and brush it along the length of the eyelash at the lid once nightly.

*How does it work?*

- Researchers are not quite sure, but in many animal studies prostaglandins such as bimatoprost have led to hair regrowth.

*When will effects be seen?*

- A 16 week trial is recommended, initial results are seen within 4 weeks. During *Latisse*® trials, subjects had an average of 1.4 mm growth of the eyelashes, along with thickening and darkening of the lashes. At the 4 week follow-up period following 16 weeks of using the product, subject lashes were returning to previous state.

*Does it have adverse affects?*

- The preservative used in prostaglandin preparations, benzalkonium chloride, can cause irritation
- Hyperpigmentation of both the iris and eyelid are seen. This does not mean that blue eyes become bluer, but rather eyes became brown-hued. The eyelid usually returns to normal color following discontinuation; however iris hyperpigmentation is usually permanent.

*How much does it cost?*

- A one-month supply of *Latisse*® is approximately \$120.

To learn more about *Latisse*® visit [www.latisse.com](http://www.latisse.com)

1. *Latisse* [package insert]. Irvine, Ca: Allergan, Inc.; 2009 Available from: <http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=9109#n1m42230-3>
2. Medical Letter, Inc. Bimatoprost 0.03% solution (*Latisse*) for eyelash enhancement. *Med Lett Drugs Ther.* 2009 Jun 1;51(1313):43-4.

### **For more information on Glaucoma, please refer to the following resources:**

Glaucoma Foundation

<http://www.glaucoma.org>

National Eye Institute

[http://www.nei.nih.gov/health/glaucoma/glaucoma\\_facts.asp](http://www.nei.nih.gov/health/glaucoma/glaucoma_facts.asp)



#### **The last "dose" ...**

A medical student says: Doctor there's something written on this patient's foot.  
The Doctor says: That's right. It's a footnote.



#### **The last "dose" ... Part Deux:**

Q: How many graduate students does it take to screw in a light bulb?

A: Only one, but it may take upwards of five years for him to get it done.

Jokes available from: <http://www.coolquiz.com/humor/jokes/category.asp?subcat=College>

*An electronic bulletin of drug and health-related news highlights, a service of ...*

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