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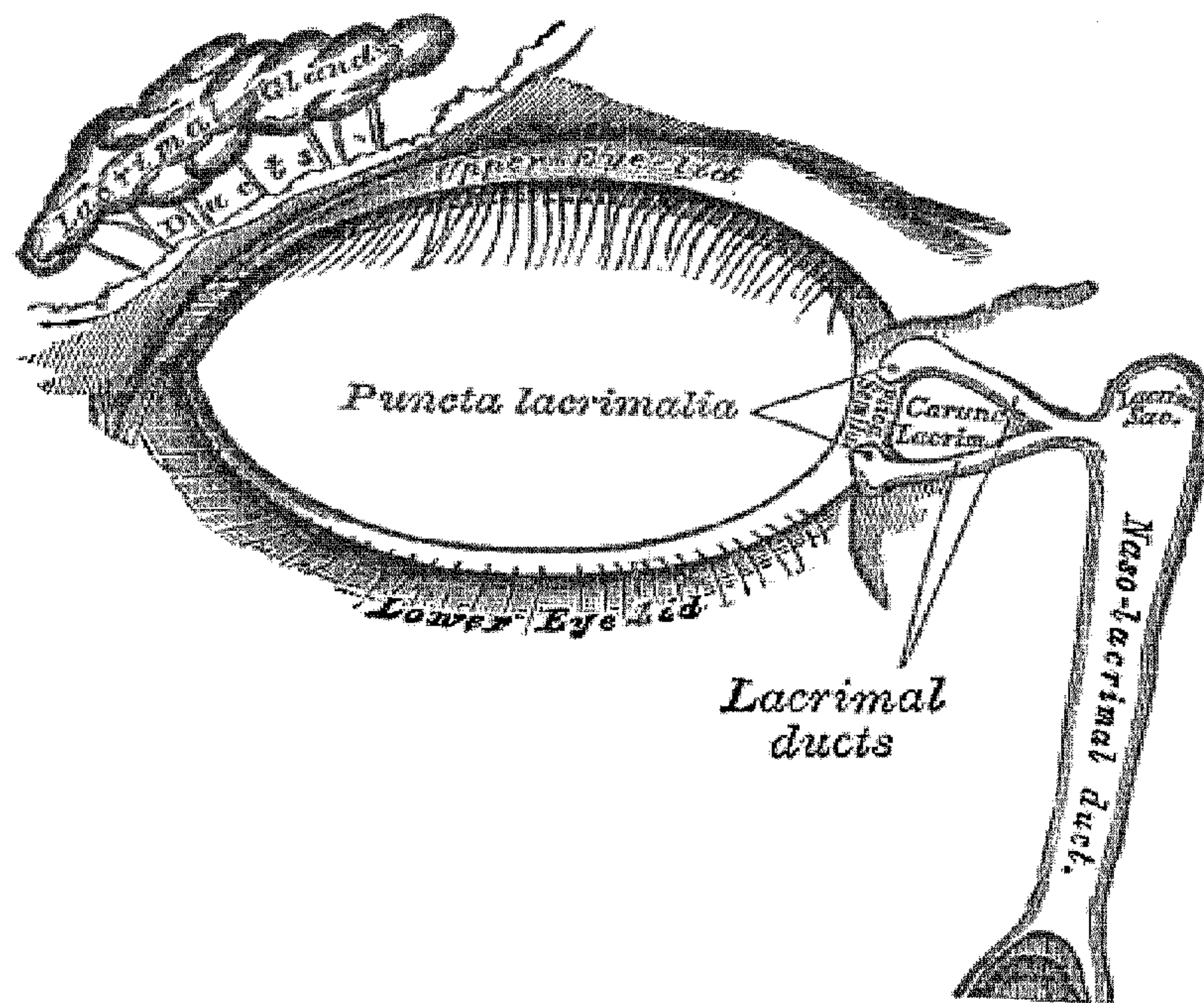
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(54) Titre : DISPOSITIF D'ADMINISTRATION DE MEDICAMENT LACRYMAL
(54) Title: LACRIMAL DRUG DELIVERY DEVICE

Fig. 1



(57) Abrégé/Abstract:

A lacrimal drug delivery device includes a reservoir configured to hold a drug. The reservoir is moveable between a relaxed state and an expanded state. A connector is fluidly coupled to the reservoir and a lumen is formed in the connector wherein the drug is configured to flow from the reservoir to an delivery site through the lumen. A hydrogel is within the lumen and configured to absorb the drug from the reservoir and deliver the drug from the lumen at the delivery site. The hydrogel includes a first section which absorbs the drug at a first rate of absorption. A delivery guide is detachably coupled to the reservoir to deliver the reservoir into a lacrimal sac of a patient.

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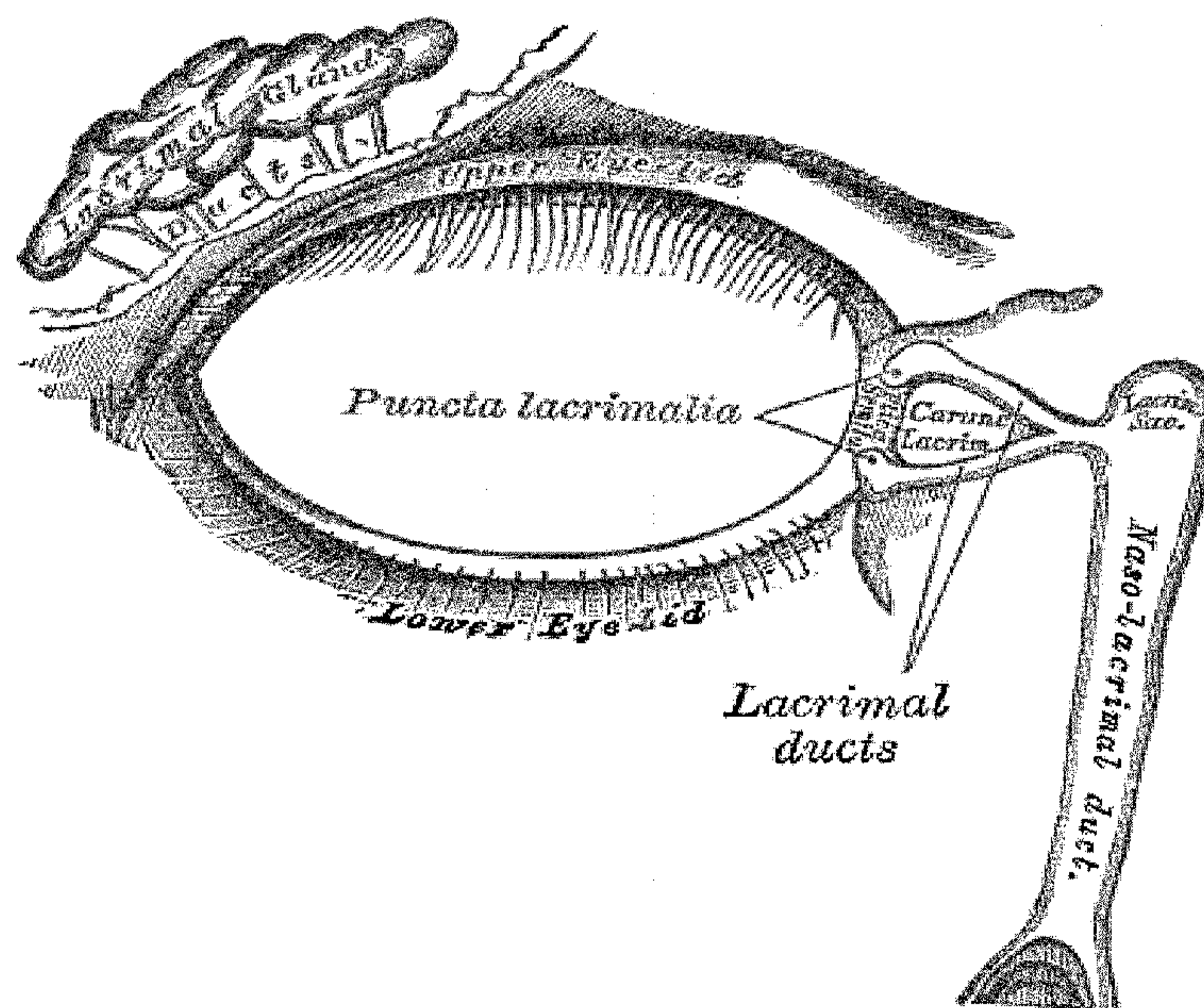
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(54) Title: LACRIMAL DRUG DELIVERY DEVICE

Fig. 1



(57) Abstract: A lacrimal drug delivery device includes a reservoir configured to hold a drug. The reservoir is moveable between a relaxed state and an expanded state. A connector is fluidly coupled to the reservoir and a lumen is formed in the connector wherein the drug is configured to flow from the reservoir to an delivery site through the lumen. A hydrogel is within the lumen and configured to absorb the drug from the reservoir and deliver the drug from the lumen at the delivery site. The hydrogel includes a first section which absorbs the drug at a first rate of absorption. A delivery guide is detachably coupled to the reservoir to deliver the reservoir into a lacrimal sac of a patient.

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CLAIMS

We claim:

1. A lacrimal drug delivery device, comprising:
 - 5 a reservoir configured to hold a drug, the reservoir expandable between a relaxed state and an expanded state;
 - a connector fluidly coupled to the reservoir, a lumen formed in the connector wherein the drug is configured to flow from the reservoir to a delivery site through the lumen;
 - 10 a hydrogel within the lumen, the hydrogel being configured to absorb the drug from the reservoir and deliver the drug from the lumen at the drug at the delivery site, the hydrogel including a first section which absorbs the drug at a first rate of absorption; and
 - a delivery guide detachably coupled to the reservoir to deliver the reservoir into a lacrimal sac of a patient.
- 15 2. The lacrimal drug delivery device of claim 1, wherein the hydrogel includes a second section which absorbs the drug at a second rate of absorption different from the first rate of absorption.
3. The lacrimal drug delivery device of claim 2, wherein the first section has a first porosity and the second section has a second porosity different from the first porosity.
- 20 4. The lacrimal drug delivery device of claim 3, wherein the first rate of absorption and the second rate of absorption are at least partially controlled by the porosity, wherein a larger porosity provides a faster rate of absorption.
- 25 5. The lacrimal drug delivery device of claim 4, wherein the first section is adjacent the reservoir and the second section is opposite the first section, the first porosity larger than the second porosity.

6. The lacrimal drug delivery device of claim 1, wherein the hydrogel includes a dry state wherein the drug is separate from the hydrogel prior to the device being implanted and a wetted state wherein the drug is absorbed by the hydrogel after the device is implanted.
- 5 7. The lacrimal drug delivery device of claim 1, wherein the connector includes a second lumen with the delivery guide removably positioned within the second lumen.
8. The lacrimal drug delivery device of claim 7, wherein the delivery guide comprises a guide wire.
- 10 9. The lacrimal drug delivery device of claim 8, wherein the guide wire includes an opening therethrough such that the drug is delivered through the opening to transfer the reservoir from the relaxed state to the expanded state.
10. The lacrimal drug delivery device of claim 7, further comprising a valve within the second
15 lumen which seals the second lumen when the delivery device is removed.
11. The lacrimal drug delivery device of claim 1, further comprising a filter coupled to the connector, the filter sealing the hydrogel within the lumen while allowing the drug to flow through the filter.
- 20 12. The lacrimal drug delivery device of claim 11, wherein the filter prevents external substances from contaminating the hydrogel.
13. The lacrimal drug delivery device of claim 11, wherein the drug is configured to elude through
25 the hydrogel and filter and the filter at least partially controls flow of the drug.
14. The lacrimal drug delivery device of claim 1, wherein the reservoir is elastic such that the reservoir exerts a compressive force on the drug when the reservoir is in the expanded state.
- 30 15. The lacrimal drug delivery device of claim 2, wherein the first section and the second section have the same or substantially similar chemical formulation.

16. The lacrimal drug delivery device of claim 2, wherein the first section and the second section have different formulations.
17. The lacrimal drug delivery device of claim 16, wherein the first section is hydrophilic and the second section is hydrophobic.
18. The lacrimal drug delivery device of claim 17, wherein the lumen includes a proximal end and a distal end and the ratio of the first section to the second section is greater at the proximal end than at the distal end.
19. The lacrimal drug delivery device of claim 18, wherein the first section extends from the proximal end to the distal end such that the drug is transferred along the lumen through the first section.
20. The lacrimal drug delivery device of claim 2, wherein the first section has a first thickness and the second section has a second thickness less than the first thickness such that the first section absorbs the drug faster than the second section.
21. The lacrimal drug delivery device of claim 20, wherein the lumen has a distal diameter adjacent the reservoir and a proximal diameter opposite the reservoir, wherein the proximal diameter is smaller than the distal diameter.
22. The lacrimal drug delivery device of claim 1, wherein the delivery site is at least one of a lacrimal punctum and nasolacrimal duct.
23. A lacrimal drug delivery device, comprising:
- a reservoir configured to hold a drug, the reservoir moveable between a relaxed state and an expanded state;
 - a connector fluidly coupled to the reservoir, the connector including a first lumen, a second lumen, a proximal end, and a distal end, the drug configured to flow from the reservoir to a delivery site through the first lumen;

a hydrogel within the first lumen, the hydrogel configured to absorb the drug from the reservoir and deliver the drug from the lumen at the delivery site;

a delivery guide within the second lumen and configured to transfer the reservoir between the relaxed state to the expanded state, the delivery guide detachably coupled to the reservoir
5 to position the reservoir in a lacrimal sac of a patient; and

a valve within the second lumen, the valve sealing the second lumen when the delivery guide is removed and allowing the delivery guide to be reinserted to retransfer the reservoir between the relaxed state and the expanded state.

10 24. The lacrimal drug delivery device of claim 23, wherein the delivery guide includes an opening and the drug is delivered through the opening and into the reservoir to transfer the reservoir from the relaxed state to the expanded state.

15 25. The lacrimal drug delivery device of claim 23, wherein the hydrogel includes a first section with a first rate of absorption and a second section with a second rate of absorption different than the first rate of absorption.