Advanced Therapeutic Options for Ocular Surface Disease: Blood-Derived Products, Insulin Eye Drops, and Human Amniotic Membrane

COS Practice Resource Centre General Information for Patients and Providers

Introduction

Blood-derived ocular lubricants have emerged as an effective option to treat dry eye and other ocular surface diseases including when loss of corneal integrity arises. These options include Autologous Serum Tears (AST), Platelet-Rich Plasma (PRP), Plasma Rich in Growth Factors (PRGF), topical insulin drops or human amniotic membrane (HAM).

This resource aims to equip providers and patients with general information about various treatment options for ocular surface disease. This information may not be fully comprehensive but is intended to supplement and not replace discussion between patients and providers. Patients should seek the expertise of their provider before using the products discussed below.

Definitions

Blood-derived drops

- Autologous Serum Tears (AST): The patient's blood is centrifuged and the serum component, which contains growth factors and other biochemical nutrients similar to natural tears, is made into eye drops.
- Platelet-Rich Plasma (PRP): The patient's blood is centrifuged to remove blood cells and still retains platelets, which contain growth factors. Therefore, there is a higher concentration of growth factors in PRP drops compared to AST.
- Plasma Rich in Growth Factors (PRGF): PRGF is a refined form of PRP that further removes inflammatory factors and activates additional release of growth factors from platelets.

Topical Insulin drops

- Insulin: When topically applied, insulin supports corneal epithelial cell proliferation, nerve regeneration, and wound healing.

Topical Human Amniotic Membrane (HAM)

- HAM: The innermost avascular layer of the placenta is composed of a basement membrane that resembles that of the cornea, conjunctiva, and stroma. This layer contains hyaluronic acid and cytokines that help reduce inflammation.

Pathophysiology of Dry Eye Disease

Dry eye disease (DED) is a multifactorial disease with multiple contributing factors including tear film instability, hyperosmolar tear composition, inflammatory environment, reduced microbiome diversity and neurosensory abnormalities. Often chronic in nature, dry eyes lead to discomfort, visual disturbance, and reduced quality of life. Management of dry eye disease is individualized to each patient depending on whether the condition is primarily evaporative in the setting of meibomian gland dysfunction, due to aqueous deficiency, or a combination of both.

Conventional therapies typically include one of more of the following: artificial tears, warm compresses, anti-inflammatory drops, punctual occlusion, moisture chamber goggles, scleral lenses, omega-3 fatty acids, oral tetracyclines, microblepharoexfoliation and both thermal and non-thermal lid treatments with or without meibomian gland expression. However, these therapies may be inadequate for severe cases of dry eye or when ocular surface integrity is compromised.

Blood-derived drops contain tear-like trophic and growth factors (e.g., EGF, TGF-β, vitamin A, fibronectin, albumin) that can enhance epithelial healing, reduce inflammation, and support corneal nerves, thus serving as an effective tool in our armamentarium of dry eye therapies. PRP/PRGF provide a higher and more stable load of platelet-derived growth factors relative to diluted serum. The process of preparing PRGF additionally lowers pro-inflammatory cells and cytokines in the drop preparation.

Insulin simulates insulin-like growth factor-1 (IGF-1) in tears, which binds insulin and IGF-1 receptors on corneal epithelial and nerve cells to help with epithelial proliferation for wound closure, upregulating neurotrophic factors for nerve regeneration and facilitating ocular surface healing.

HAM is a biological scaffold and reservoir of trophic factors that support corneal healing by providing a matrix to facilitate adhesion and migration of epithelial stem cells. Furthermore, HAM has an immune modulatory effect on inflammatory pathways, and has anti-inflammatory and anti-fibrotic effects. Furthermore, it mitigates the biochemical immunomodulatory pathways and supports nerve regeneration. It can be used in cases of epitheliopathy secondary to dry eye with or without an epithelial defect given its dual function of structural and nutritional support.

Treatment Goals

- Improve tear film homeostasis
- Reduce ocular surface inflammation
- Improve patient quality of life by reducing irritation, dryness and vision fluctuations

Comparison of Options

	AST	PRP	PRGF	Insulin	HAM

Contains	Cell-free serum	Plasma retaining concentrated platelets	Plasma containing concentrated growth factors, free of leukocytes and fibrin	Pharmacological-grade insulin (for subcutaneous use)	Derived from the innermost layer of human placenta
Preparation	Autologous blood is centrifuged; serum is separated then diluted with sterile BSS.	Autologous blood with anticoagulant is centrifuged at 20-25°C; platelet rich factor is extracted	Standardized protocol with Health Canada approval; autologous blood with anticoagulant is centrifuged at room temperature, activated with $CaCl_2$ to maximize platelet release, incubated at 37°C for 1 hour, heated to 56°C to deactivate immune and IgE activity, then filtered to obtain supernatant rich in growth factors.	Compounded from pharmacological-grade insulin diluted with artificial tears/saline solution	Grafts are available as cryopreserved, dehydrated, or an acellular membrane applied directly to the ocular surface
Biochemical profile	Contains tear-like growth factors, vitamins, immunoglobulins	Higher concentration of regenerative growth factors compared to AST (2.5-8x more platelets which contain growth factors)	Higher concentration of growth factors and reduced leukocytes, inflammatory cytokines, and IgE compared to PRP	Insulin activates insulin-like growth factor (IGF-1) signaling on corneal epithelium	Rich in growth factors, extracellular matrix proteins and anti-inflammatory cytokines; provides scaffold for epithelial adhesion, migration, and repair
Pros	Mimics natural tear composition; long safety track record	Stronger regenerative potential compared to AST due to higher concentration of growth factors; improved corneal staining compared to artificial tears	More standardized; reduced inflammatory mediators; strong in vitro trophic and anti-inflammatory effects	Promotes epithelial healing and nerve regeneration due to anti-inflammatory, anti-fibrotic and anti-angiogenic properties	Structural mimicry results in improved wound repair and epithelium regeneration
Cons	Protocol heterogeneity; uncertain long-term efficacy; higher concentration of	Preparation variability; risk of pro-inflammatory	Evidence base is smaller; requires proprietary	Limited research on mechanism of epithelial regeneration and stability; cost not	High cost; some forms require suturing to ocular surface (minor procedure); temporary visual blur while in

	inflammatory modulators compared to PRGF (not recommended when host harbours systemic inflammatory disease, e.g. rheumatoid arthritis)	cytokines in leukocyte-rich PRP	system; cost not covered by insurance	covered; for some, cost might be covered by insurance	place; variable biologic potency between donors/preparations

AST, Autologous Serum Tears; PRP, Platelet-Rich Plasma; PRGF, Plasma Rich in Growth Factors; HAM, Human Amniotic Membrane.

Indications

- Moderate to severe DED refractory to optimized conventional therapy (preservative-free tears, lid hygiene, topical immunomodulators, punctal plugs)
- Autoimmune DED (e.g., Sjögren's syndrome)
- Post-keratorefractive or ocular surface surgery-related DED
- Persistent epithelial defects
- Neurotrophic keratopathy
- Corneal neuralgia
- Contact lens-intolerant severe DED
- Corneal melt or thinning
- Post-surgical ocular surface reconstruction
- Limbal stem cell deficiency

Contraindications

- AST/PRP/PRGF
    - Poor venous access or inability to tolerate repeated blood draws due to systemic comorbidities or medical instability
    - Low hemoglobin, platelet dysfunction, coagulation disorder, thrombocytopenia or other hematologic condition preventing safe phlebotomy, safe preparation of platelet-based product or platelet-derived growth factor release
    - Severe systemic infection
    - Bloodborne infections depending on institutional processing policies
- Topical insulin
    - None

- Human amniotic membrane
    - Active ocular infection until controlled

How to prescribe (for providers)

- **Autologous Serum Tears (AST)**: 20%, 30% or 40% 1 gtt into affected eye(s) qid, 3 months supply x unlimited repeats

    Available at various compounding pharmacies (see list below) or specialized clinics
- **Platelet-Rich Plasma (PRP)**: 20% 1 gtt into affected eye(s) qid, 3 months supply x unlimited repeats

    Available at various compounding pharmacies or specialized clinics
- **Plasma Rich in Growth Factors (PRGF):** 1 gtt into affected eye(s) 4-6 x daily, 3 months supply x unlimited repeats

    Available at various specialized eye care clinics and clinics affiliated with BioScript Solutions (Coverdale Infusion Clinics - locations listed here: https://labtician.com/for-patients/what-is-prgf)
- **Topical Insulin drops:** Up to 25 IU/ml 1 gtt OU into affected eye(s) 4-6 x daily, 1-3 months supply x unlimited repeats

    Available at various compounding pharmacies or by faxing prescription to Specialty Pharma Solutions fax #: 1-855-888-8598 with patient contact information and wholesale pharmacy will connect with your patient directly to arrange shipment to their home. You can request pre-printed order forms by contacting Angela Jenkins <ajenkins@auxiliumhealth.ca>
- **Human amniotic membrane**

    Fresh frozen from local eye bank via local cornea specialist

    Dehydrated (can be stored at room temperature): https://ophthalogix.com/ or https://corzaeye.com/products/biologics/amniotic-membrane-clinic
        - Can place directly onto cornea surface then covered with a bandage contact lens

    Cryopreserved (requires -80 degree refrigerator storage): https://biotissue.com/products/ocular/prokera/
        - Can place directly onto the cornea surface

Pharmacies that compound AST, PRP, and Insulin drops in Canada:

Last updated June 2026. Note this is not an exhaustive list. Your optometrist or ophthalmologist may also provide these therapeutic options. Prescriptions can be brought to the pharmacies below. The COS does not endorse any of these providers.

AST Pharmacy Providers

Province	City	Provider/Clinic	Address	Link
BC	Vancouver	MacDonald's Pharmacy	746 West Broadway Vancouver, BC V5Z 1G8	https://www.macdonaldsrx.com/compounding.php
AB	Calgary	Scripts Pharmacy	7015 Macleod Trl SW, Calgary, AB T2H 0L3	https://www.scriptpharmacy.ca/
AB	Lethbridge	Medicine Shoppe Pharmacy by Hospital	1016A 20st S, Lethrbridge, AB, T1K 2C9	https://medicineshoppebyhospital.ca/
AB	Edmonton	Strathcona Prescription Centre	8225 105 St NW, Edmonton, AB T6E 4H2	https://www.strathconapharmacy.com/
SK	Regina	Saskatchewan Health Authority Eye Centre	Level 3 (Elevators #10 and #11), Pasqua Hospital, 101 Dewdney Avenue, Regina, SK S4T 1A5	https://www.saskhealthauthority.ca/your-health/conditions-diseases-services/eye-care
SK	Saskatoon	Medical Arts Building Pharmacy	133-750 Spadina Crescent East , SK, S7K 3H3	Phone- 306-652-5252 Fax- 306-652-5254
ON	Richmond Hill (Greater Toronto Area)	People's Choice Compounding Pharmacy	10063 Yonge Street, Richmond Hill, ON L4C 1T7	https://peopleschoicepharmacy.ca/
ON	Mississauga (Greater Toronto Area)	Hooper's Pharmacy	88 Lakeshore Road East, Mississauga, ON L5G 1E1	https://hoopershealth.com/mississauga-pharmacy/
ON	North York (Greater Toronto Area)	Haber's Pharmacy	1783 Avenue Rd, Toronto ON M5M 3Y8	https://haberspharmacy.com
ON	London	Canadian Apothecary	1064 Adelaide Street North London, ON N5Y 2N1	https://canapo.ca/ Blood draw required first from Lifelabs at 334 Wellington Rd. London, ON
ON	Windsor	Hunter Pharmacy	3019 Tecumseh Rd E, Windsor, ON N8W 1G8	https://hunterspharmacy.ca/
ON	Kingston	Lovell Drugs (Insulin drops only)	812 John Marks Drive Unit B, Kingston, ON K7L 0J7	https://lovelldrugs.com/location?lat=44.41802978008216&lon=-76.58185576989716
ON	Ottawa	Ottawa Eye Institute	501 Smyth Rd, Ottawa, ON K1H 8L6	https://www.ottawahospital.on.ca/en/clinical-services/deptpgrmcs/departments/pharmacy/
ON	Oshawa (Custom Care)	Custom Care Pharmacy & Compounding Centre	501 Coldstream Drive, Unit 6, Oshawa, ON L1K 3B3	https://www.customcarepharmacy.ca/
QC	Montreal	La Pharmacie Linda Frayne	5858 Côte des Neiges, suite 400 Montréal, Québec, H3S 1Z1	https://pharmafrayne.com/
QC	St. Laurent	Pharmacie J. Blanchette Brusewitz and K. Manoukian Inc.	4929b Place Olivia St-Laurent, Quebec, H4R 2V6	Telephone 514.373.2404 Fax 514.373.2414
NB	Moncton	Mapleton Pharmacy	210 Price Street Moncton, NB E1A 2L2	https://www.mapletonpharmacy.com/
NL	Mount Pearl, Newfoundland	Compounding Wellness Sterile Lab	48 Commonwealth Avenue, Mount Pearl, NL A1N 5B6	https://sterilelab.ca/

PRP Pharmacy Providers

Province	City	Provider/Clinic	Address	Link
AB	Calgary	Vector Eye Center	Suite 1705, 1632 14 Ave. NW, Calgary, AB T2N 1M7	vectoreyecentre.com/service/dry-eye-treatment/
AB	Calgary	Scripts Pharmacy	7015 Macleod Trl SW, Calgary, AB T2H 0L3	https://www.scriptpharmacy.ca/
BC	North Vancouver	Vancouver Eye Doctor	1233 Lynn Valley Rd Unit 255, North Vancouver, BC V7J 0A1, Canada	vancouvereyedr.ca/advanced-dry-eye-treatment/platelet-rich-plasma/
BC	Kelowna	Pagdin Health	#1 – 1131 Lawson Ave., Kelowna, BC V1Y 6T8	pagdinhealth.com/prp-treatments-kelowna/prp-for-dry-eyes/
NS	Annapolis Valley	Valley Family Optometry & OAB+ Blood Collection	545 Victoria Drive, Kingston, Nova Scotia B0P 1R0; Unit 170 – 21 Roy Ave New Minas, NS B4N 3C6	oabblood.ca/services
AB	Edmonton	Strathcona Prescription Centre	8225 105 St NW, Edmonton, AB T6E 4H2	https://www.strathconapharmacy.com/
ON	Richmond Hill (Greater Toronto Area)	People's Choice Compounding Pharmacy	10063 Yonge Street, Richmond Hill, ON L4C 1T7	https://peopleschoicepharmacy.ca/
ON	NorthYork (Greater Toronto Area)	Haber's Pharmacy	1783 Avenue Rd, Toronto ON M5M 3Y8	https://haberspharmacy.com
ON	Mississauga (Greater Toronto Area)	Hooper's Pharmacy	88 Lakeshore Road East, Mississauga, ON L5G 1E1	https://hoopershealth.com/mississauga-pharmacy/
NL	Paradise, St. John's	Catalyst Health Solutions Inc.	1489 Topsail Road, Paradise, NL A1L1P9	https://catalysthealthsolutions.ca/services/endoret-prgf-eye-drops-dry-eye-treatment
QC	Montreal	La Pharmacie Linda Frayne	5858 Côte des Neiges, suite 400 Montréal, Québec, H3S 1Z1	https://pharmafrayne.com/

Topical Insulin Pharmacy Providers

Province	City	Pharmacy	Address	Link
ON	Scarborough	Atria Compounding Pharmacy	69 Lebovic Ave D104, Scarborough, ON M1L 0H2	atriapharmacy.com/contact-us
ON	Gloucester (Ottawa)	Royal Drugs	1100 Algoma Road, Ottawa, ON K1B 0A3	oms.ca/royal-drugs/
ON	North York (Greater Toronto Area)	Haber's pharmacy	1783 Avenue Rd, Toronto, ON M5M 3Y8	haberspharmacy.com/
ON	Richmond Hill (Greater Toronto Area)	People's Choice Compounding Pharmacy	10063 Yonge Street, Richmond Hill, ON L4C 1T7	https://peopleschoicepharmacy.ca/
ON	Mississauga (Greater Toronto Area)	Hooper's Pharmacy	88 Lakeshore Road East, Mississauga, ON L5G 1E1	https://hoopershealth.com/mississauga-pharmacy/
AB	Edmonton	Lemarchand Dispensary Pharmacy & Compounding Lab	LeMarchand Mansion, 11523 100 Ave NW #105, Edmonton, AB T5K 0J8	https://lemarchanddispensary.ca/
QC	Montreal	B. Morin, J.-F. Morin and S. Morin (Proxim pharmacie)	5955 Sherbrooke Street East Montreal, Quebec, H1N 1B7	Phone: 514.254.7513 Fax : 514-254-6739
QC	St. Laurent	Pharmacie J. Blanchette Brusewitz and K. Manoukian Inc.	4929b Place Olivia St-Laurent, Quebec, H4R 2V6	Telephone 514.373.2404 Fax 514.373.2414
QC	Montreal	La Pharmacie Linda Frayne	5858 Côte des Neiges, suite 400 Montréal, Québec, H3S 1Z1	https://pharmafrayne.com/
NS	Halifax	East Coast Apothecary	101 – 842 Portland Street , Dartmouth, Nova Scotia, B2W 0N2	https://pans.ns.ca/pharmacy/east-coast-apothecary/
NL	Mount Pearl, St. John's	Compounding Wellness Sterile Lab	48 Commonwealth Avenue, Mount Pearl, NL A1N 5B6	https://sterilelab.ca/
All provinces	Wholesale pharmacy	Specialty Pharma Solutions	Fax: 1-855-888-8598	https://www.specialtypharmasolutions.ca

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