# AUTOLOGOUS SERUM TEARS: AN OVERLOOKED TREATMENT FOR DRY EYE


A refresher on what these drops do and why clinicians should consider using them more.

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Ocular surface disorders can be detrimental to a patient's quality of life in many ways because they can cause pain and vision loss. Some examples include dry eye syndrome, persistent epithelial defects (from herpes, diabetes, alkali burns, etc.), Sjögren syndrome, graft-versus-host disease, Stevens-Johnson syndrome, and limbal stem cell deficiency. The type of ocular surface disorder, as well as the severity, will determine the treatment regimen. These treatment options can include artificial tears, lubricating gel drops, ointments, hot compresses, omega vitamins, cyclosporine eye drops, punctal plugs, steroid eye drops, autologous serum tears, bandage contact lenses, and devices designed to increase oil production from the meibomian glands in the upper and lower lids (eg, intense pulsed light). Eye care practitioners are familiar and comfortable with recommending most of these treatment methods, with the exception of autologous serum tears. And when clinicians do recommend autologous serum tears to patients, they are typically implemented only as an end-stage therapy, when patients could have benefitted from using them much earlier. This article discusses the mechanism of action, advantages, and drawbacks of prescribing autologous serum eye drops in treating patients with ocular surface disorders. But first, a quick refresher on tears and drops.

## ALL ABOUT TEARS (AND DROPS)

*Reflex tears* are the tears we experience when we cry. *Basal tears* are continuously produced to provide lubrication to the ocular surface. Both types of natural tears consist of water, mucin, lipids, proteins (lysozyme, lactoferrin, lipocalin, immunoglobulins, and peroxidase), electrolytes (sodium, potassium, chloride, bicarbonate, magnesium, and calcium), growth factors (epidermal growth factor), cytokines, and glucose.[1]

*Autologous serum* is a blood-derived eye drop, in which the donor and recipient are the same individual (see *Autologous Serum FAQs*). The serum is created by extracting blood from the patient, clotting, centrifuging, and diluting with sterile saline, and is then

## AUTOLOGOUS SERUM FAQs

**Where can I get autologous serum drops made for my patients?** Contact Vital Tears (vitaltears.org) to become a provider. O'Brien Pharmacy (obrienrx.com) in Mission, Kansas, also does compounding, but if you order through them you will have to find a lab that is willing to do the blood draw and shipping. Vital Tears is an all-inclusive service.

**How does it work?** Patients can have blood drawn at any of Vital Tears' network of outpatient facilities. Each order is prepared according to specifications from the patient's eye care provider. Vital Tears handles payments, delivery, and refills.

**How long will it take for patients to receive their serum drops?** Patients receive them as quickly as 48 hours after their blood is collected.

**How long do the drops last?** One week in refrigeration and 6 months frozen.

**What concentration should I use?** The concentration should typically be between 20% and 50%. Concentrations 60% and higher will contain too much transforming growth factor beta, which has been shown to have antiproliferative effects. High concentrations of transforming growth factor beta may suppress wound healing of the epithelium.[5] Recent literature indicates that higher concentration autologous serum drops are most effective,[3] so we usually order concentrations of 40% to 50%.

stored in the freezer. These drops should be stored in the freezer until use, and then stored in the refrigerator once opened. These drops are used to treat a variety of ocular surface disorders, including those listed above.[2-4] Autologous serum contains proteins (lysozyme, lactoferrin, albumin, and immunoglobulins), growth factors (epidermal growth factor), vitamins A and C, antioxidants, and electrolytes (sodium, potassium, chloride, bicarbonate, magnesium, calcium). The components are almost identical to those of the basal tears; however, autologous serum typically contains an increased concentration of each component compared with basal tears.[2-4] The mechanism of action of autologous serum eye drops is to mimic the biochemical properties of natural basal tears in order to heal the ocular surface epithelium.[2-4]

### WHY USE AUTOLOGOUS SERUM TEARS?

In our professional experience, patients who use autologous serum in conjunction with other dry eye treatment therapies have a significant and faster improvement of signs and symptoms, due to the serum's ability to mimic their natural tears. Unlike artificial tears, these drops have antibacterial and antiinflammatory properties, and, because they are derived from the patient's own body, they also provide an increased benefit to the population of patients who are opposed to the use of artificial substances.

We typically prescribe serum tears for acute and chronic phases of dry eye. Patients with persistent epithelial defects can typically stop using the autologous serum once they have healed, but patients with more persistent ocular surface disease, such as those with dry eye with associated Sjögren syndrome, will often need to use the autologous serum drops long term or possibly for the rest of their lives.

Still, as mentioned above, even when considering these advantages, autologous serum drops are not normally implemented until a patient has end-stage disease. It could significantly benefit these patients if autologous serum eye drops were implemented sooner. Part of the reason behind practitioners' reluctance stems from the idea that prescribing autologous serum can be a daunting process, considering the initial time and research needed for patient education and finding an affordable

## AT A GLANCE

- Autologous serum is a blood-derived eye drop that can be used to treat a variety of ocular surface diseases.
- The mechanism of action of autologous serum drops is to mimic the biochemical properties of natural basal tears in order to heal the ocular surface epithelium.
- Barriers to using autologous serum include cost and chair time, but patients tend to have better and quicker improvement compared with use of traditional dry eye drops.



compounding pharmacy. However, once the initial research is complete, the process becomes simpler.

Autologous serum must be compounded under sterile conditions, which in the past was possible at most pharmacies. However, with increased regulations, many have stopped because it is no longer cost-effective. Our practice works with the company Vital Tears. We send the prescription and the correct concentration to Vital Tears, and the company completes the rest of the process, including the blood draw, preparation, and delivery. Vital Tears can compound autologous serum tears as a single supply or based on a subscription model. If the severity of the ocular disorder indicates that a long-term treatment regimen may be necessary, then a subscription model is recommended to the patient to reduce the cost. Eye care practitioners should never refuse to suggest autologous serum as a treatment option to patients, but patients may understandably decline to use these drops for financial reasons.

## DRAWBACKS

Autologous serum is not an FDA-approved therapy for ocular surface disorders, and is therefore not covered by medical insurance. Consequently, the monthly cost to patients is typically not feasible unless access to a university laboratory or sterile compounding pharmacy is found. Otherwise, the average out-of-pocket cost is approximately $400 to $500 for a 3-month supply. For most patients, this can be a barrier to treatment.

## OTHER OPTIONS

Homologous serum (the donor is someone other than oneself), cord blood serum, and finger-prick autologous serum[6] are alternative treatment options. We have yet to prescribe homologous or cord blood serum, so we cannot attest to their efficacy or prescription process. However, the finger-prick method can provide a low-cost alternative to autologous serum eye drops. With this method, patients prick their own clean finger with a lancet and apply a drop of blood to the lower fornix of the affected eye or eyes four times a day for 4 weeks.[6]

## GIVE AUTOLOGOUS SERUM A CHANCE

Autologous serum is an all-natural and effective blood-derived eye drop used to treat ocular surface disorders. Every patient with mild to severe and acute to chronic ocular surface disorders can benefit from this treatment, so the option should always be presented. If a patient declines the therapy due to cost, let that decision be up to him or her. ■

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