Analysis of IL-10 in the intraocular fluids of patients with infectious uveitis

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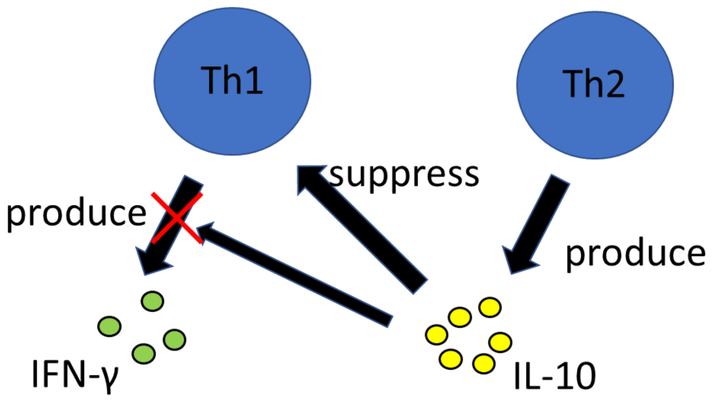
Background:
Measurement of vitreous interleukin-10 (IL-10) is critical for the diagnosis of intraocular lymphoma. Some reports have shown increases of aqueous humor or vitreous concentration of IL-10 in bacterial endophthalmitis, in acute retinal necrosis（ARN）, in VZV-related iridocyclitis, and parasitic disease. In other words, IL-10 has an important role in infectious immunity. On the other hand, IL-10 may have an inhibitory effect on infectious immunity.

What is IL-10?:
- IL-10 is one of the cytokines produced by immune cells including helper Th2 cells, and dendritic cells generally.
- IL-10 suppresses the function of antigen - presenting cells and T cells.
- IL-10 suppresses the production of inflammatory cytokines.

→IL-10 suppresses the inflammatory and autoimmune reactions.

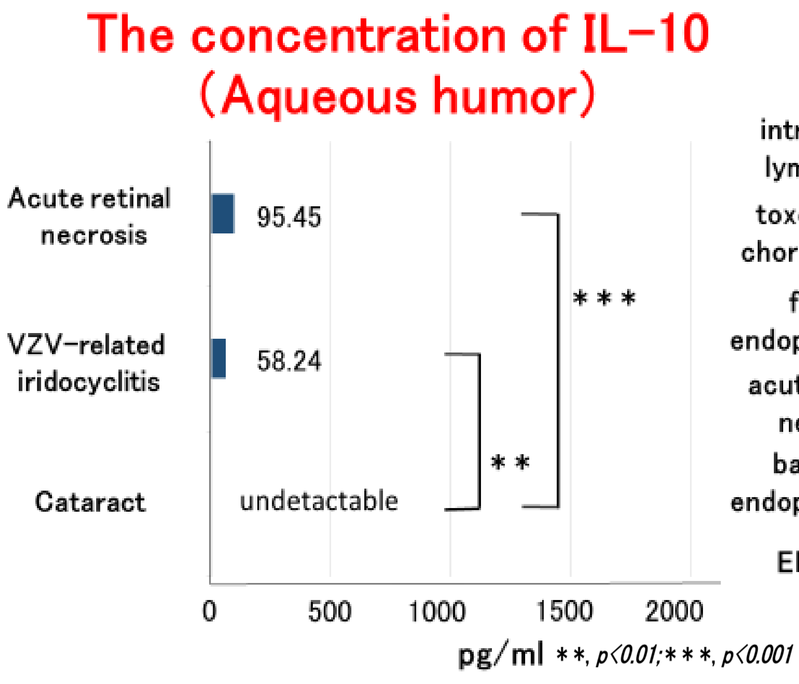


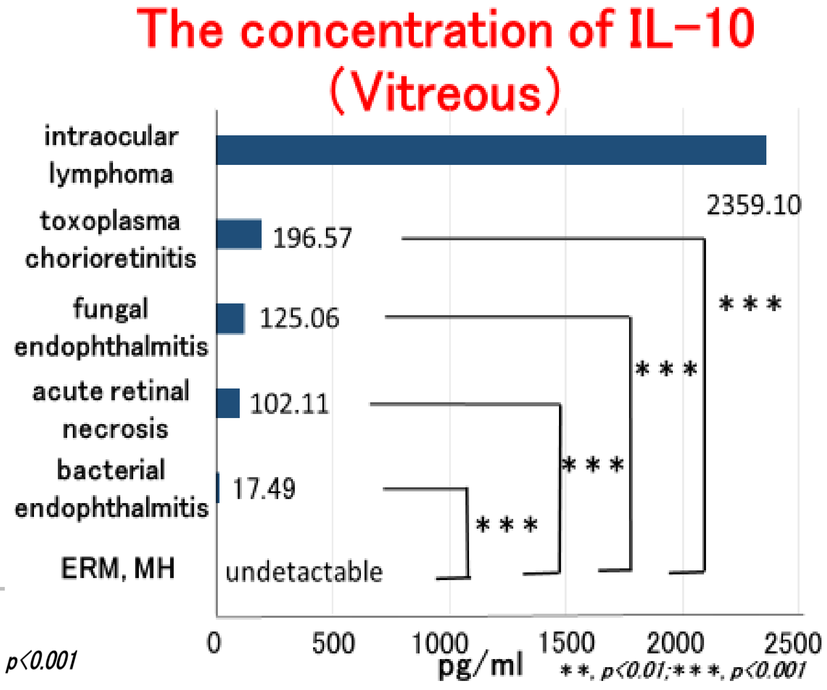
Purpose :
In this study, we measured and analyzed the concentrations of IL-10 in intraocular fluids obtained from patients with various forms of infectious uveitis.

Subjects and Methods :
Aqueous humor or vitreous humor samples were collected from 31 eyes with ARN, 13 eyes with bacterial endophthalmitis, 6 eyes with fungal endophthalmitis, 9 eyes with VZV-related iridocyclitis, 3 eyes with toxoplasma chorioretinitis, 30 eyes with intraocular lymphoma, 26 eyes with epiretinal membrane or macular hole, and 22 eyes with cataract. The concentrations of IL-10 were measured using the Cytometric Bead Array Flex kit^{R}

	cases / eyes	Mean age	M : F
Bacterial endophthalmitis	13 / 13	69.9±18.4	7 : 6
Fungal endophthalmitis	6 / 6	64.7±20.3	5 : 1
Virus			
acute retinal necrosis	31 / 31	50.3±1.4	23 : 8
VZV-related iridocyclitis	9 / 9	55.8±4.9	2 : 7
Parasite			
toxoplasma chorioretinitis	3 / 3	61.7±2.8	1 : 2
Intraocular lymphoma	24 / 30	64.7±9.2	9 : 15
Cataract	21 / 22	69.9±4.2	13 : 8
ERM, MH	26 / 26	66.6±4.2	8 : 18

Results:
The average vitreous humor IL-10 concentrations in eyes with bacterial endophthalmitis (17 pg/ml), fungal endophthalmitis (125 pg/ml), ARN (102 pg/ml) and toxoplasma chorioretinitis (197 pg/ml) were significantly higher than that in eyes with epiretinal membrane or macular hole, and significantly lower than that in eyes with intraocular lymphoma (2,359 pg/ml). IL-10 was detected in aqueous humor samples from eyes with ARN (mean 95 pg/ml) and VZV-related iridocyclitis (mean 58 pg/ml) but not in eyes with cataract.





The average vitreous humor IL-10 concentration in eyes with intraocular lymphoma was significantly higher than that in eyes with any other infectious uveitis.
IL-10 was not detected in eyes with cataract, epiretinal membrane or macular hole.
IL-10 was detected in eyes with every infectious uveitis, irrespective of the causative microorganism.

Discussion :
Elevation of IL-10 level in intraocular fluid was not observed in patients with non-infectious uveitis such as sarcoidosis and Vogt-Koyanagi-Harada disease. Even if elevated, the levels were very low.
In the case that infectious uveitis is suspected but the causative microorganism is not detected by culture, polymerase chain reaction (PCR) or other tests, demonstration of elevated IL-10 level in intraocular fluids would suggest the possibility of infectious uveitis.
Ranking of vitreous humor IL-10 concentration:
toxoplasma chorioretinitis > fungal endophthalmitis > ARN > bacterial endophthalmitis
A report shows that more than 99% of all microorganisms on earth can't be cultured.
In the case of viral infection, IL-10 is produced mainly by the virus-infected cells. In the case of bacterial, fungal and parasitic infections, however, the source of IL-10 production remains unknown (immune cell? Infected tissue?).
We found that IL-10 level in intraocular fluids is higher in infectious uveitis that progresses slowly, such toxoplasma chorioretinitis and fungal endophthalmitis. This finding suggests that cells involved in chronic inflammation or infected tissue may be a more important source of IL-10 production, rather than cells involved in acute inflammation such as neutrophils.

Conclusion :
Elevated levels of IL-10 were detected in intraocular fluids of patients with infectious uveitis irrespective of the causative microorganism, suggesting that IL-10 could be related to the infectious immunity.