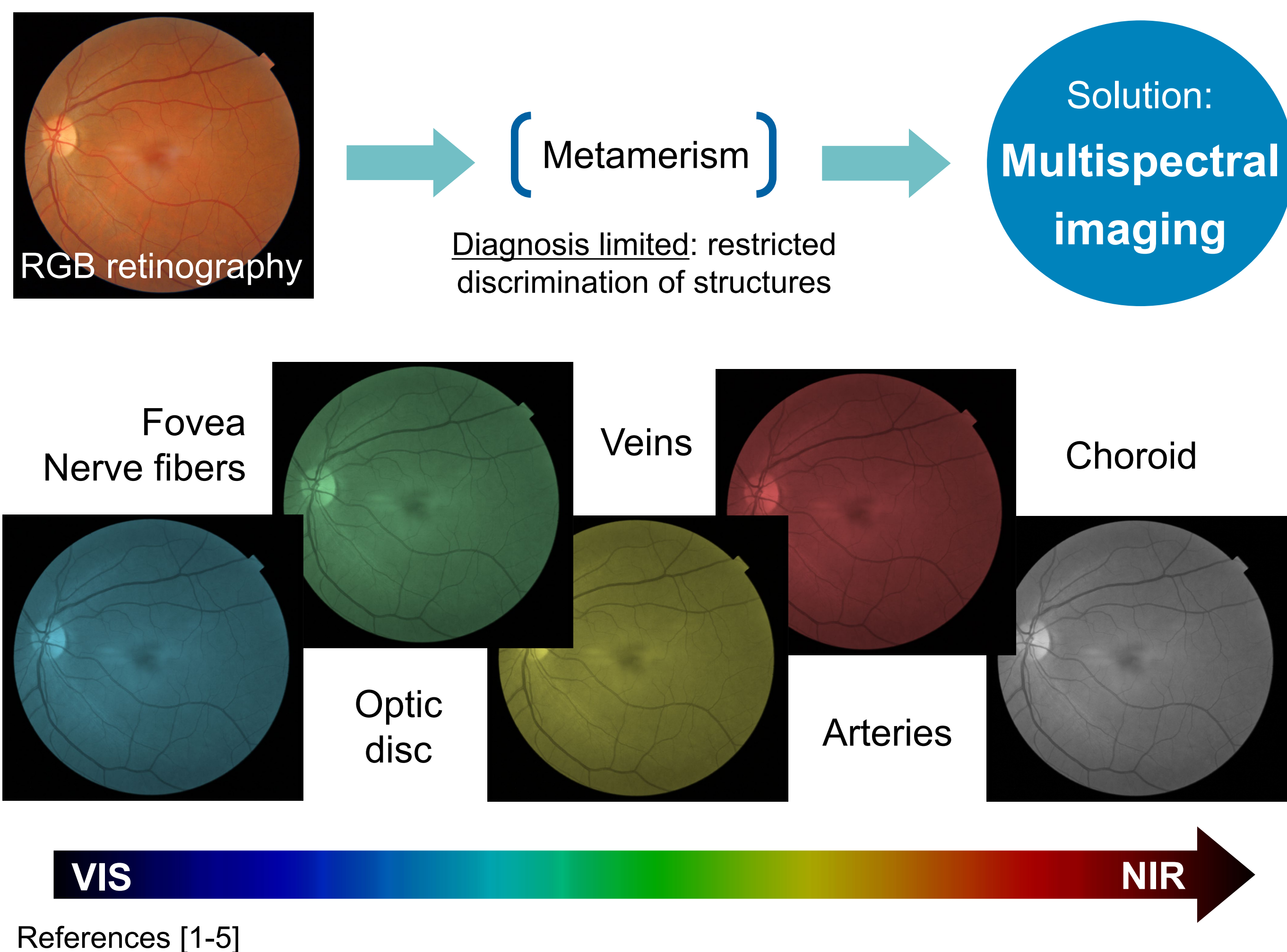




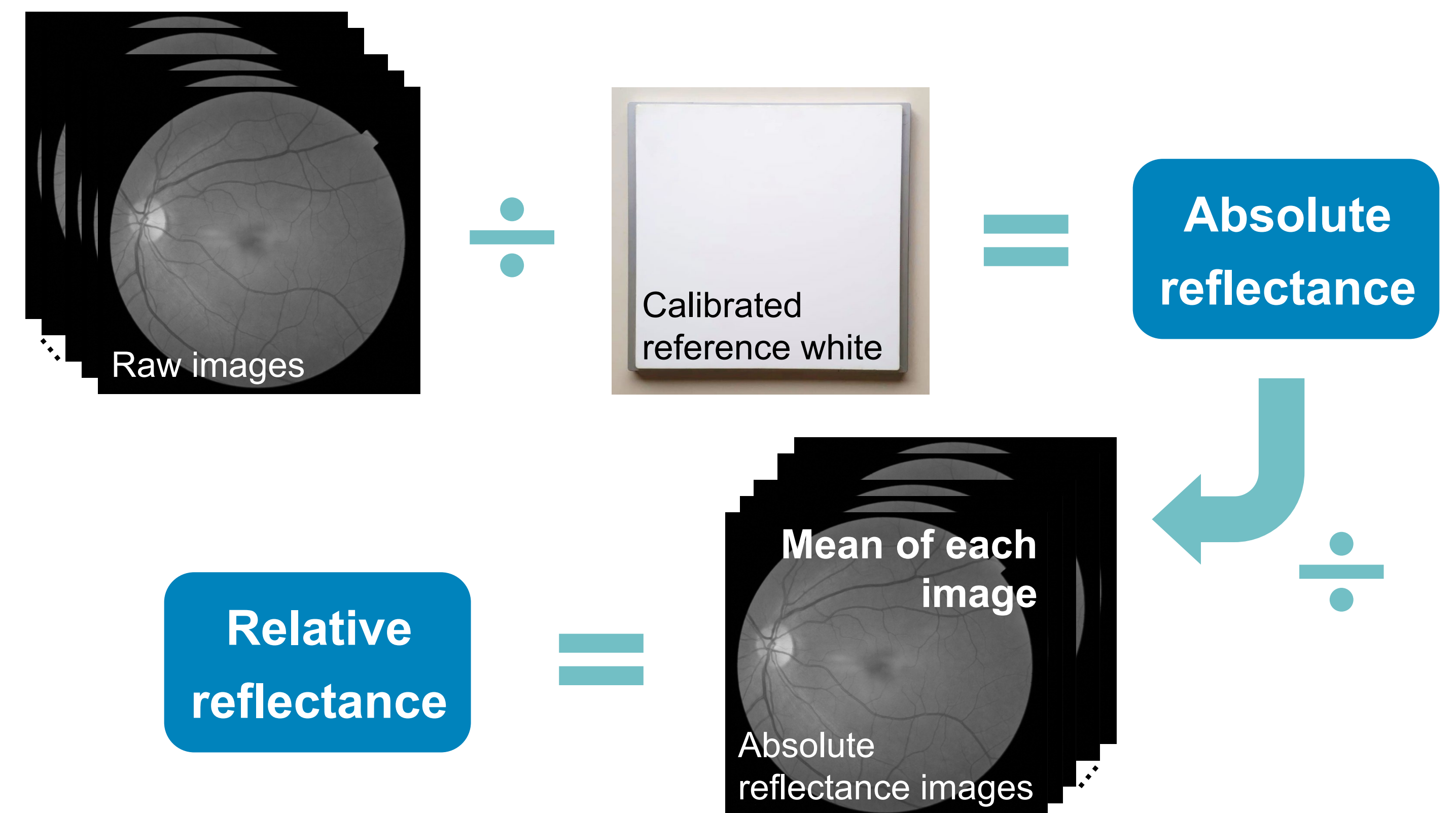
MULTISPECTRAL RETINOGRAPHY IN HEALTHY ADULT POPULATION

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INTRODUCTION



SPECTRAL REFLECTANCE



GOAL

Study the **spectral reflectance** of **eye fundus structures** in healthy subjects by means of a **fast visible and extended infrared multispectral fundus camera** (400 nm – 1300 nm) with high spectral and spatial resolution, **including** the relatively **unexplored range** beyond **900 nm** [6], which has been recently developed at the CD6-UPC.

SUBJECTS

University Vision Center (CUV-UPC)

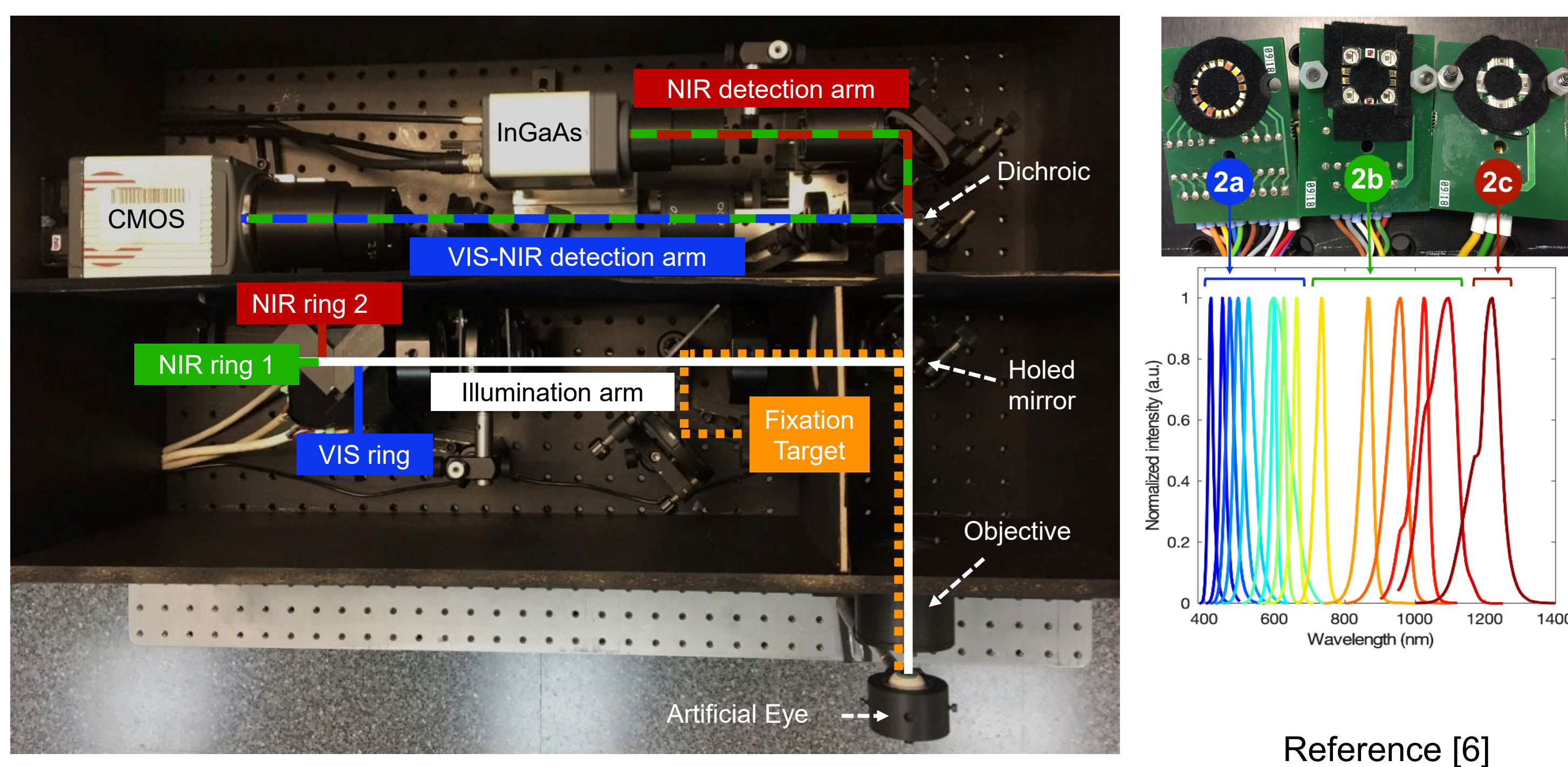
81 subjects → 126 eyes (54.4% females, 45.6% males) | Age (mean ± SD): 47.9 ± 17.4 [19, 81] years

Inclusion criteria

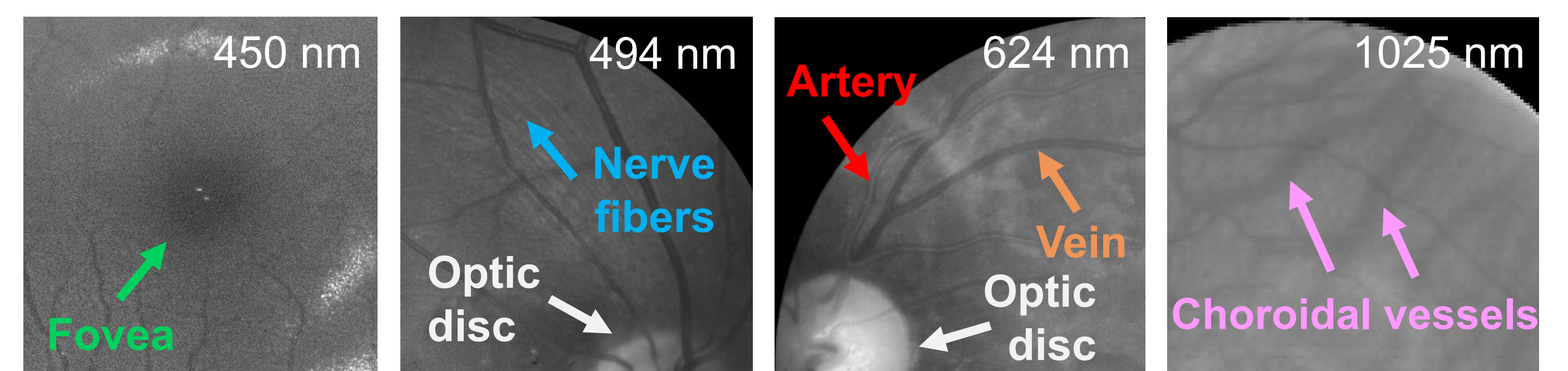
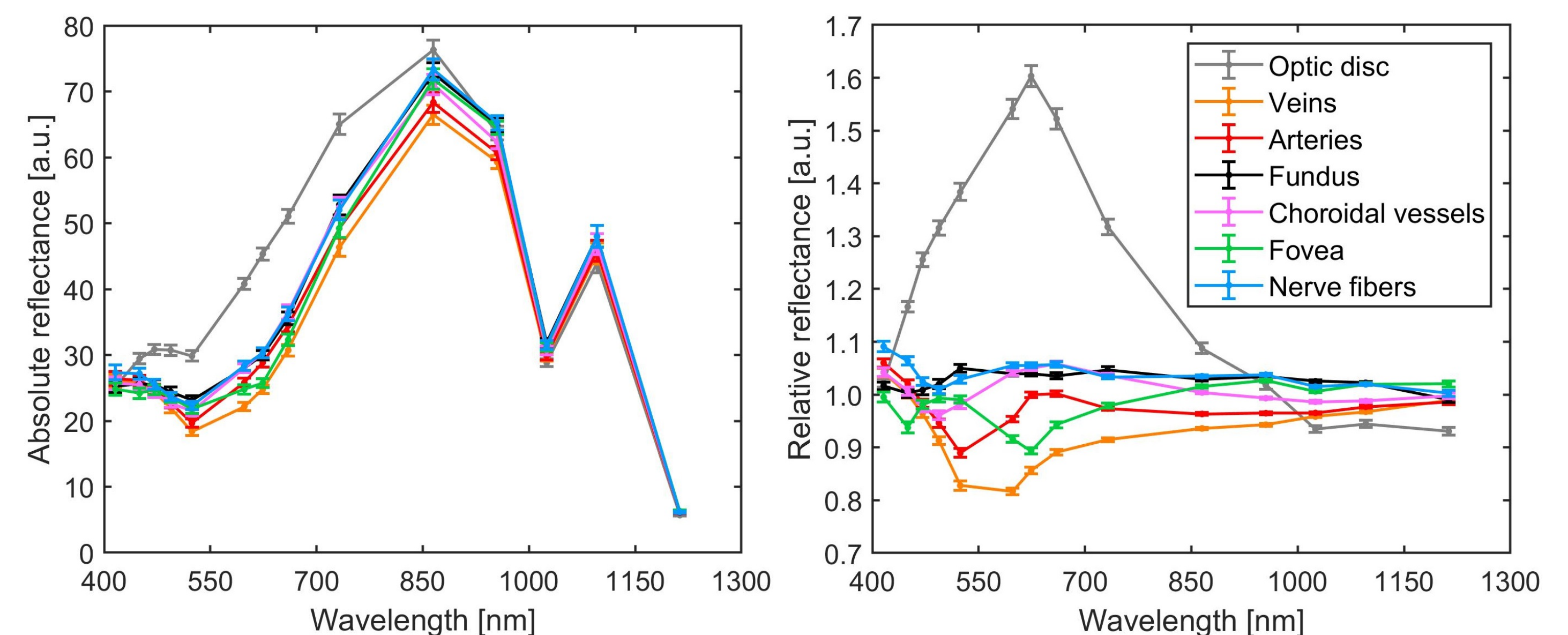
- Best-corrected visual acuity ≥ 0.9 decimal units
- Intraocular pressure ≤ 21 mmHg
- No ocular pathologies

MULTISPECTRAL FUNDUS CAMERA

- Optical correction range: ±15D
- Acquisition time: 613 ms
- Non-mydriatic
- Field of view: 30°



RESULTS



CONCLUSIONS

The **reflectance analysis** performed by means of the fast visible and extended infrared multispectral fundus camera [6] provides a new methodology to **spectrally analyze** the main structures in the **eye fundus**. The **NIR region** entails **relevant spectroscopic information** that is commonly missed by traditional techniques (choroid). The **precise** characterization of the **spectral reflectance** of eye fundus in healthy population will help to **detect any alteration** that could lead to a pathology, especially if it affects **deep layers** and even at **early stages**, which is crucial to avoid vision loss.

REFERENCES

- [1] C. Zimmer, D. Kahn, R. Clayton, P. Dugel, and K. B. Freund, "Innovation in Diagnostic Retinal Imaging: Multispectral Imaging," *Retin. Today* Oct., 94–99, (2014).
- [2] R. W. Knighton, S. G. Jacobson, and C. M. Kemp, "The spectral reflectance of the nerve fiber layer in macaque retina.," *Invest. Ophthalm. Vis. Sci.* 30(11), 2393-2402 (1989).
- [3] F. C. Delori and K. P. Pflibsen, "Spectral reflectance of the human ocular fundus.," *Appl. Optics* 28(6), 1061–1077 (1989).
- [4] T. J. M. Berendschot, P. J. DeLint, and D. V. Norren, "Fundus reflectance—historical and present ideas," *Prog. Retin. Eye Res.* 22(2), 171–200 (2003).
- [5] R. A. Bone, J. T. Landrum, L. H. Guerra, and C. A. Ruiz, "Lutein and Zeaxanthin Dietary Supplements Raise Macular Pigment Density and Serum Concentrations of these Carotenoids in Humans," *J. Nutr.* 133(4), 992–998 (2003).
- [6] T. Alterini, F. Díaz-Doutón, F. J. Burgos-Fernández, L. González, C. Mateo, M. Vilaseca, "Fast visible and extended near-infrared multispectral fundus camera.," *J. Biomed. Opt.* 24(9), 096007-1 – 096007-7 (2019).

