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Skin cancer screening – better safe than sorry

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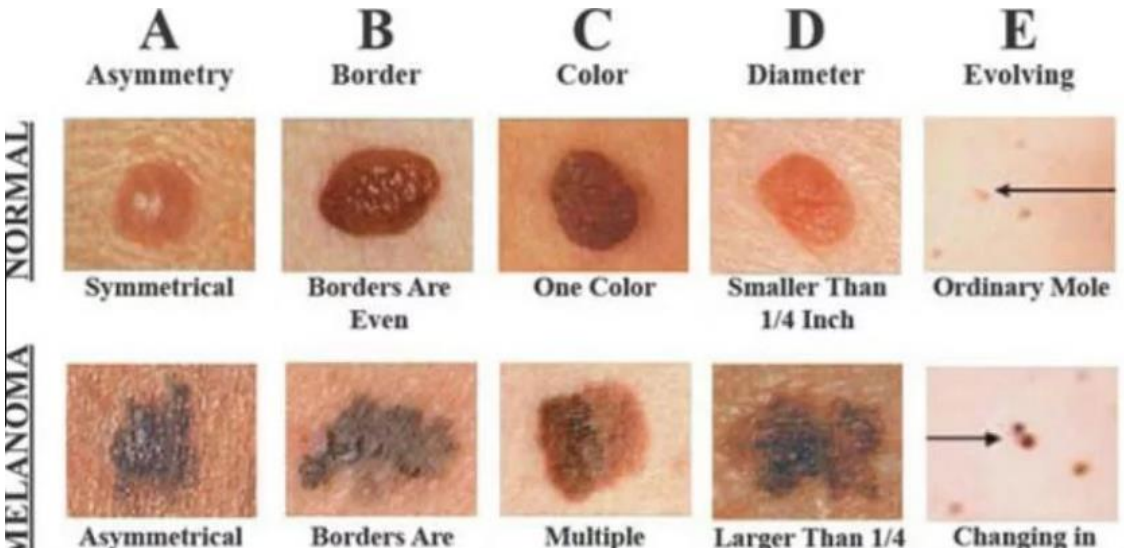
What is skin cancer?

- **Melanoma** and non-melanoma: **basal cell carcinoma** (BCC), **squamos cell carcinoma** (SCC) and others.



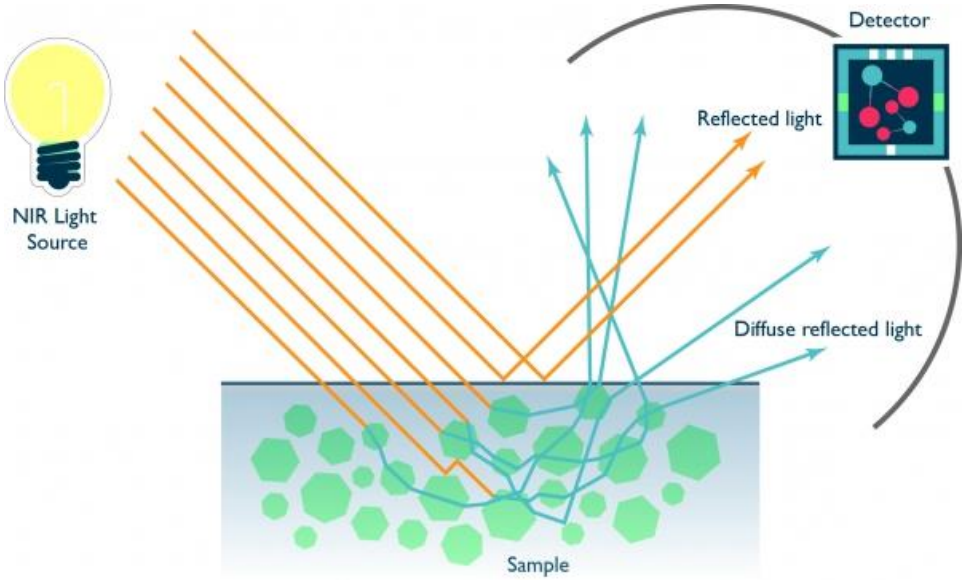
http://tiphero.com/the-skin-cancer-detector-that-could-save-your-life/
http://superstarsi.pl/img/articles/1019/14026595039587-normal.jpg?_v=1408276326

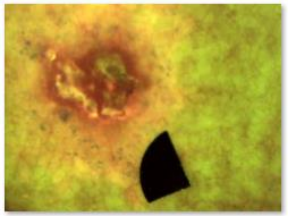
What is skin cancer?

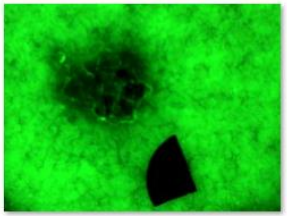
- People who first use **a tanning bed** before age 35 **increase their risk for melanoma by 75 percent** [1]
- The vast majority of **melanomas** are caused by the sun. In fact, one UK study found that about 86 percent of melanomas can be attributed to **exposure to ultraviolet (UV) radiation from the sun** [2]
- In Latvia there are 200 new melanoma cases and 1200 other skin cancer cases yearly. [SPKC report, 2016]

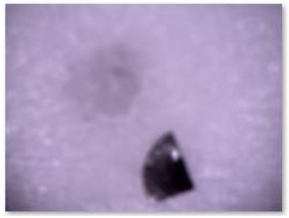
[1] The International Agency for Research on Cancer Working Group. The association of use of sunbeds with cutaneous malignant melanoma and other skin cancers: a systematic review. *Int J Canc* 2006; 120:1116-1122.
[2] Parkin DM, Mesher D, Sasieni P. Cancers attributable to solar (ultraviolet) radiation exposure in the UK in 2010. *Br J Cancer 2011*; 105:S66-S69.

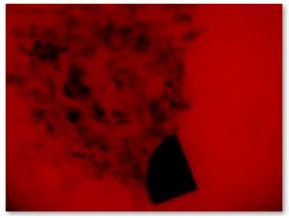
Proposed method: skin screening





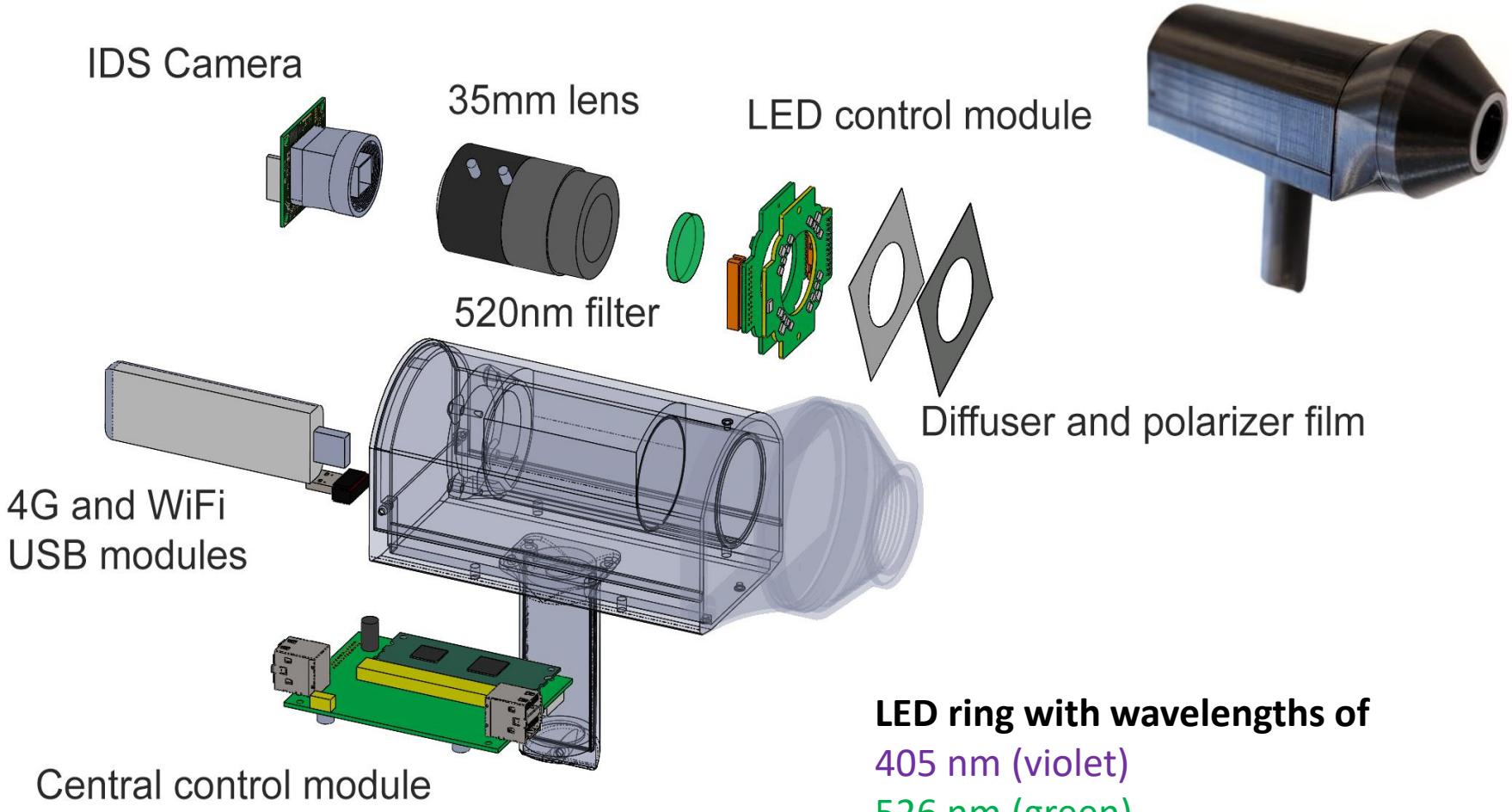






https://www.pulpandpapercanada.com/news/canadian-mills-opt-for-fitnir-analyzers-1100000232

Prototype



LED ring with wavelengths of

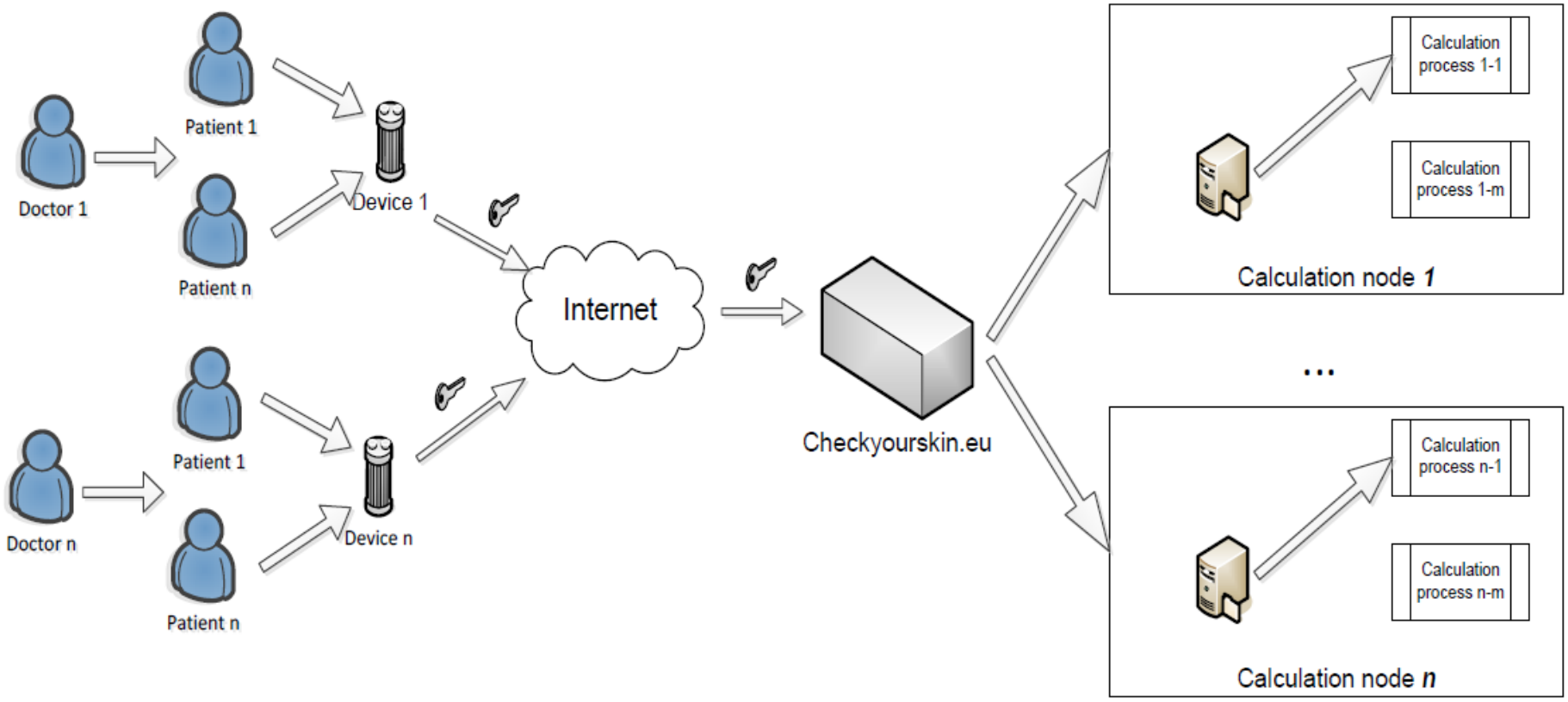
405 nm (violet)

526 nm (green)

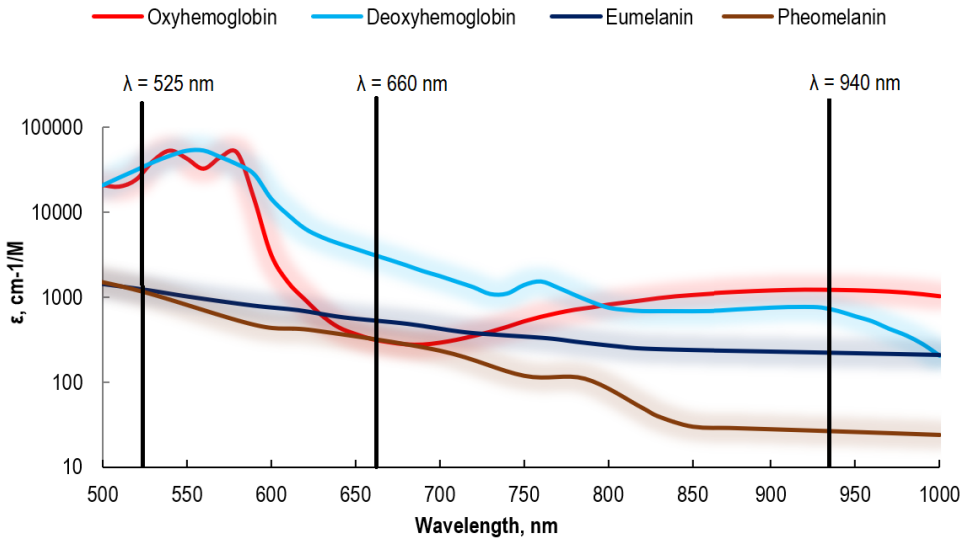
663 nm (red)

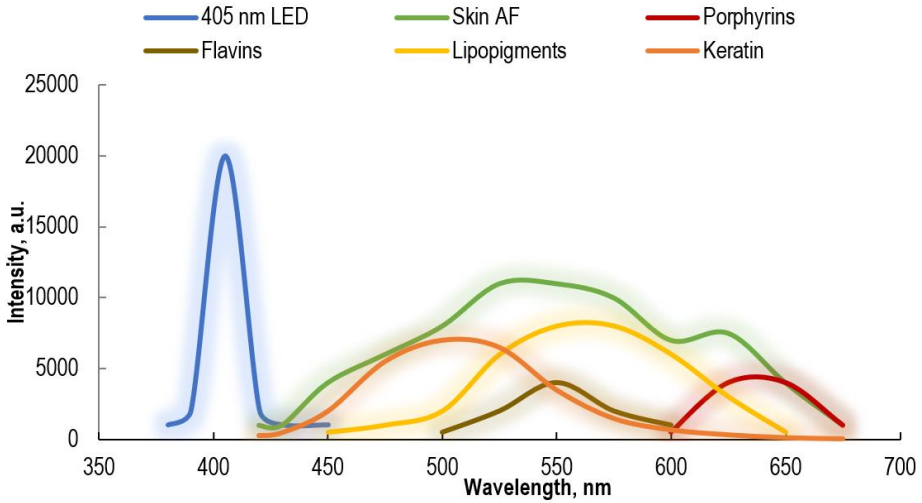
964 nm (infrared)

Cloud server



Diffuse reflectance and autofluorescence



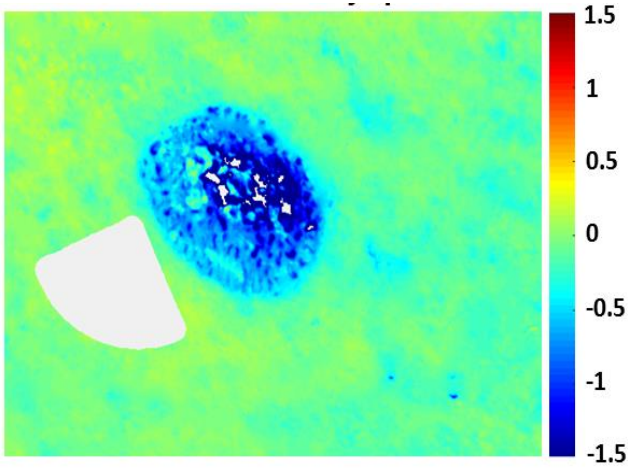


Hyperkeratosis

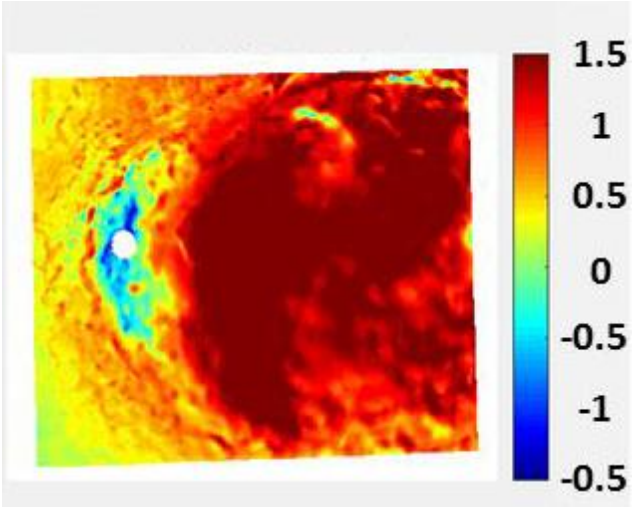
Melanoma criterion

$$p' = lg\left(\frac{I(526)\cdot I_{skin}(663)\cdot I_{skin}(964}{I(663)\cdot I(964)\cdot I_{skin}(526)}\right)$$

Criterion for melanoma: $p'>1$



Benign nevus

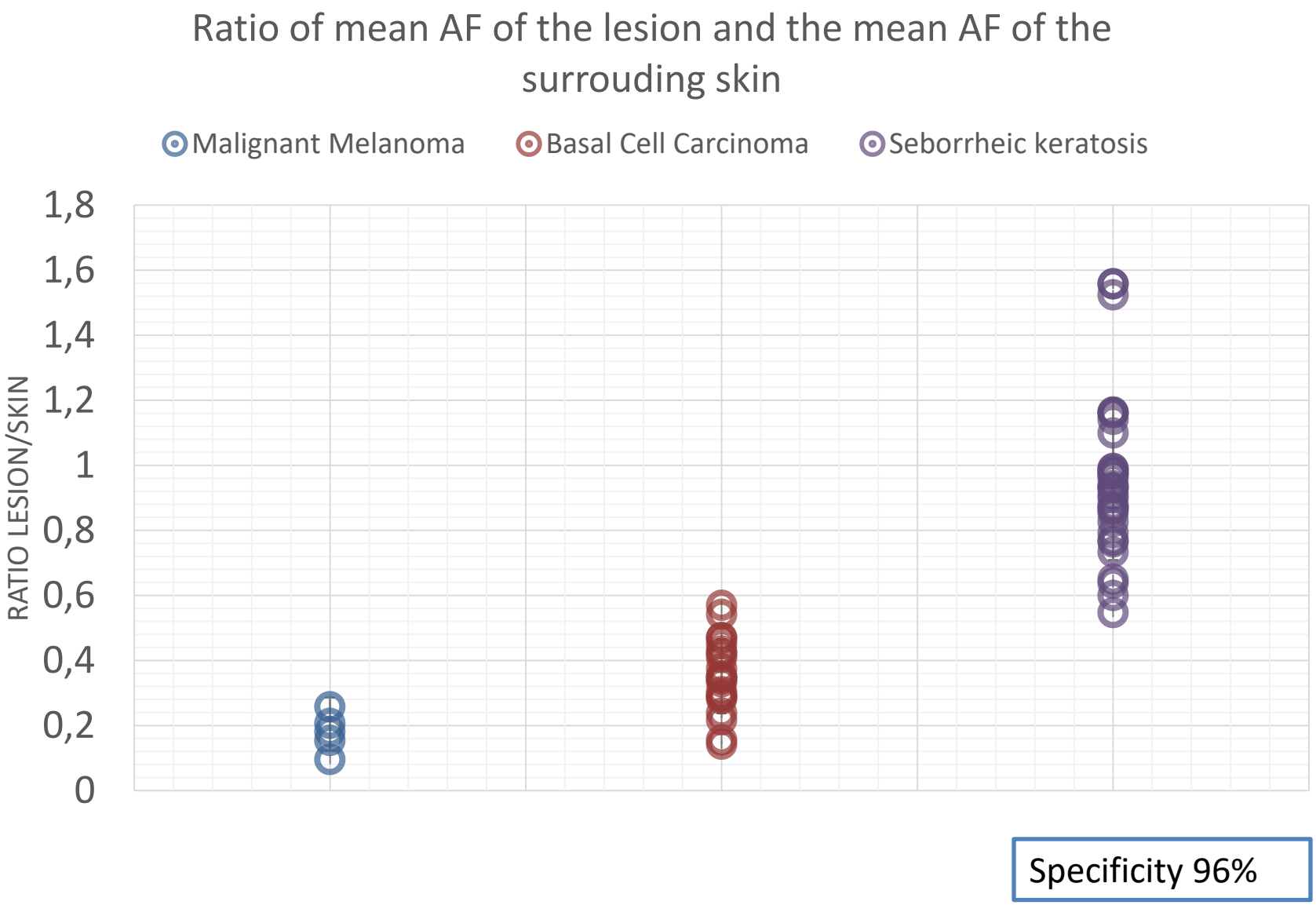


malignant melanoma

Clinical trial results

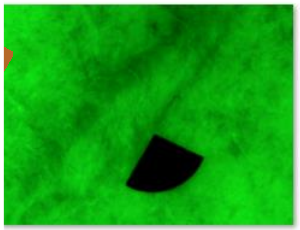
Specificity 94%

Clinical trial results



Specificity 96%

Future: Post-operative scar evaluation and smartphone solution



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a_09-24-22_10835.png

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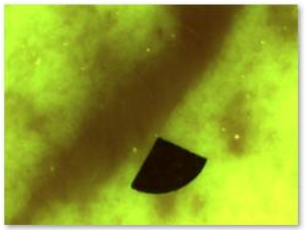

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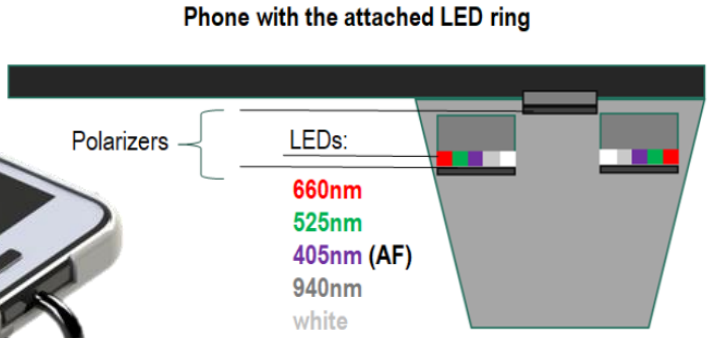
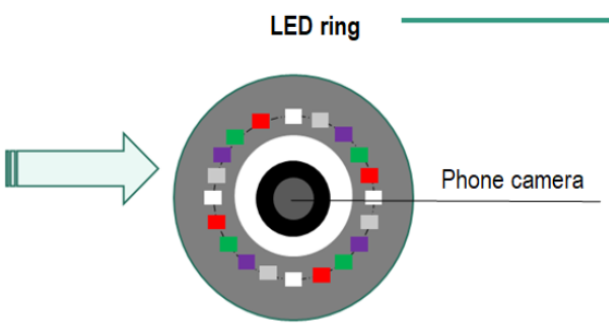
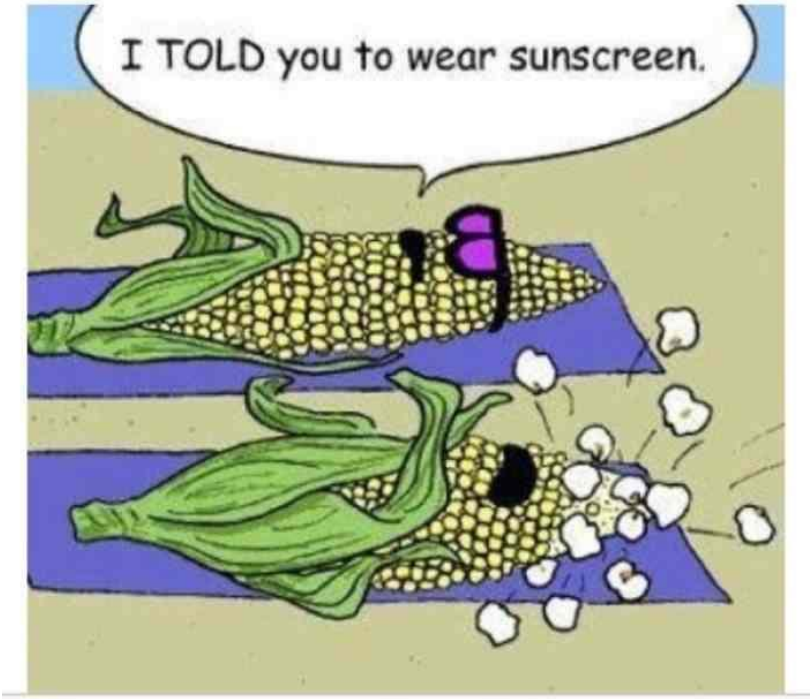




Conclusions

- ✓ Method is non-invasive, visual, inexpensive and easy to use
- ✓ Method for skin cancer screening at primary healthcare level
- ✓ Can be a great help to a family doctor or a general practicioner for early skin cancer diagnosis
- ✓ Possible tool for personal skin evaluation (smartphone version)
- ✓ Can be used for post-operative scar evaluation

Thank you!



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