

**MULTIPHOTON TOMOGRAPHY (MPT)  
FOR CORNEA TRANSPLANT DIAGNOSTICS  
AND SKIN CANCER DETECTION**

**K. König<sup>1,2</sup>**

<sup>1</sup> **Department of Biophotonics and Laser Technology, Saarland University,  
66123 Saarbrücken, Germany**

<sup>2</sup> **JenLab GmbH, Schillerstr. 1, 07745 Jena, Germany  
k.koenig@blt.uni-saarland.de**

**KEYWORDS:** multiphoton, two-photon, cornea, skin, tomography, cancer

Multiphoton tomography (MPT) has become an important imaging method for high-resolution imaging of tissue biopsies, live animals, volunteers, and patients. MPT enables optical metabolic imaging (OMI) by FLIM of autofluorescent coenzymes. The add-on module CARS provides additional information on lipids and water.

MPT helps the dermatologist to diagnose skin cancer (malignant melanoma, basal cell carcinoma) as well as inflammation sites at a very early stage, to determine a skin aging index SAAID as well as to evaluate anti-aging products.

MPT has also been used in ophthalmology to check the quality of cornea transplants by two-photon fluorescence lifetime imaging of epithelial and endothelial cells using time-correlated single photon counting and second harmonic generation detection by stromal collagen.

[1] K. König (editor). Multiphoton microscopy and fluorescence lifetime imaging. De Gruyter. Berlin, Boston, January 2018. ISBN 978-3-11-042998-5. Free download.

[2] A. Batista, HG. Breunig, K. König et al. Assessment of human corneas prior to transplantation using high-resolution two-photon imaging. Invest. Ophthalmol. Vis. Sci. 59, 176-184 (2018).