tration), respectively. In the operation room, a small fresh tissue sample was harbored from each tumor immediately after enucleation and used to start the culture. The samples were minced, mixed with a collagen matrix, and cultured under air-liquid interface conditions. PDO growth, viability, and histology were monitored over time. Culture samples were collected for immunohistochemistry and molecular analysis.

Results: ALI PDOs were established for two UM cases, with a success rate of 100 %. The PDOs exhibited histological features similar to their original tumors and were positive for the immunomarker MART-1, confirming their melanocytic phenotype. No inflammatory cells were detected by immunohistochemistry. The PDOs had steady growth in culture up to day 30, followed by slowdown and degeneration after day 60. Each culture could be split once at a 1:2 and 1:3 ratio. The viability and comparability of the ALI PDO cultures confirm their potential as a representative model for UM.

Conclusion: ALI PDO cultures were successfully established from UM patient tissue. This represents a significant step forward in UM research, offering a potential reliable in vitro platform for future epigenetic and therapeutic studies.

PDo12-05
Distribution of neurofilaments in axonal cytoskeleton as a biomarker of progressive injury of human optic nerve

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Objectives: To study the distribution of neurofilaments (NFs) in axonal cytoskeleton of human optic nerve (ON).

Methods: Longitudinal sections of 60 human ON heads trepanned from enucleated eyeballs were stained by Masson trichrome and studied using the Bioscan AT+ programme. The expression of NFs in the ON prelaminar (PL), postlaminar (PoL) parts and lamina cribrosa (LC) in individuals aged 27 to 81 years was assessed immunohistochemically with an antibody Neurofilament NE-14 using the ImageJ 1.54i programme by estimating the percentage of immunopositive pixels in a certain area on 10 images in each case. The data was statistically approved, calculating Pearson, Spearman correlation coefficients, the Kruskal-Wallis, Mann-Whitney and Kandal-Tau tests were used.

Results: It was established that the NFs expression in the ON axonal cytoskeleton reflected the axoplasmic current and correlated with the ratio of LC elastic, collagen and glial components, the differences in which determined its rigidity. The NFs expression was the lowest in the ON PL, LC and PoL parts (42.74 %, 38.04 % and 35.69 %) in the LC mixed type with uniform distribution of elastic, collagen fibres and glia predominant in all age groups. A significant increase in NFs expression was observed in the LC elastic type in 45.5 % of people aged under 44 years in the PL (51.76 %) compared to the LC (46.67 %) and PoL ON parts (42.35 %). This reflected the compensatory need to support ON axons in the absence of myelin and against damaging factors. The NFs expression was pronounced significantly in the ON PL, LC and PoL parts (69.02 %, 71.76 % and 59.61 % correspondingly) in individuals over 60 years old with the LC collagen type considered as risk factors for axonal flow blockage. In all cases, a decrease in the NFs expression was revealed in the ON PoL part because the axonal myelination improved the ON biomechanical properties.

Conclusions: The study in the heterogeneous distribution of the ON NFs across age groups revealed those axonal areas vulnerable to injury and preceded changes in ON axonal transport as an early marker of retinal ganglion cells damage. The LC remodelling through the predominance of collagen in elderly patients and vulnerability of the ON PL part in young people are considered the primary treatment indicators to deal with the progressive injury of ON axons after the cessation of the damaging factor exposure, particular after normalization of IOP in patients with glaucoma.

Vaskuläre Netzhauterkrankungen und diabetische Retinopathie

PFr01-01
Detecting diabetic retinopathy in individuals with objective indicators suggestive of possible undiagnosed diabetes mellitus using an artificial intelligence-based software platform

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Objectives: To examine the potential for the detection of diabetic retinopathy (DR) using the artificial intelligence (AI)-based software platform in patients with risk factors of diabetes mellitus.

Methods: This was an open-label, prospective, observational case-control study for the detection of DR in patients with risk factors using an AI-based software platform. The study was conducted at the sites of healthcare facilities in Chernivtsi region, Lviv region, Kyiv region and Kyiv-city. 5655 individuals (11.310 eyes) were involved in the study. All fundus images were analyzed using the artificial intelligence (AI)-based software platform Retina-AI CheckEye©.

Results: All patients were divided into two groups. The first group consisted of 1841 patients, who had diabetes mellitus, and the second group had 3814 patients with risk factors of diabetes mellitus. Using the AI-based software platform, in the first group signs of DR were detected in 366 diabetics (19.88 % of the diabetics). In the second group signs of DR were detected in 33 individuals, who had not diabetes mellitus (0.87 % of patients with risk factors). The diagnoses of DR were verified by expert ophthalmologists in each patient.

Conclusions: AI-based software platform, Retina-AI CheckEye© system helps to diagnose the presence of diabetic retinopathy not only in patients with diabetes, but also in patients with risk factors, and can be used for mass screening of the disease. Health care system need to pay more attention for patients with risk factors of diabetes mellitus and perform prophylactic examinations of the eye fundus.
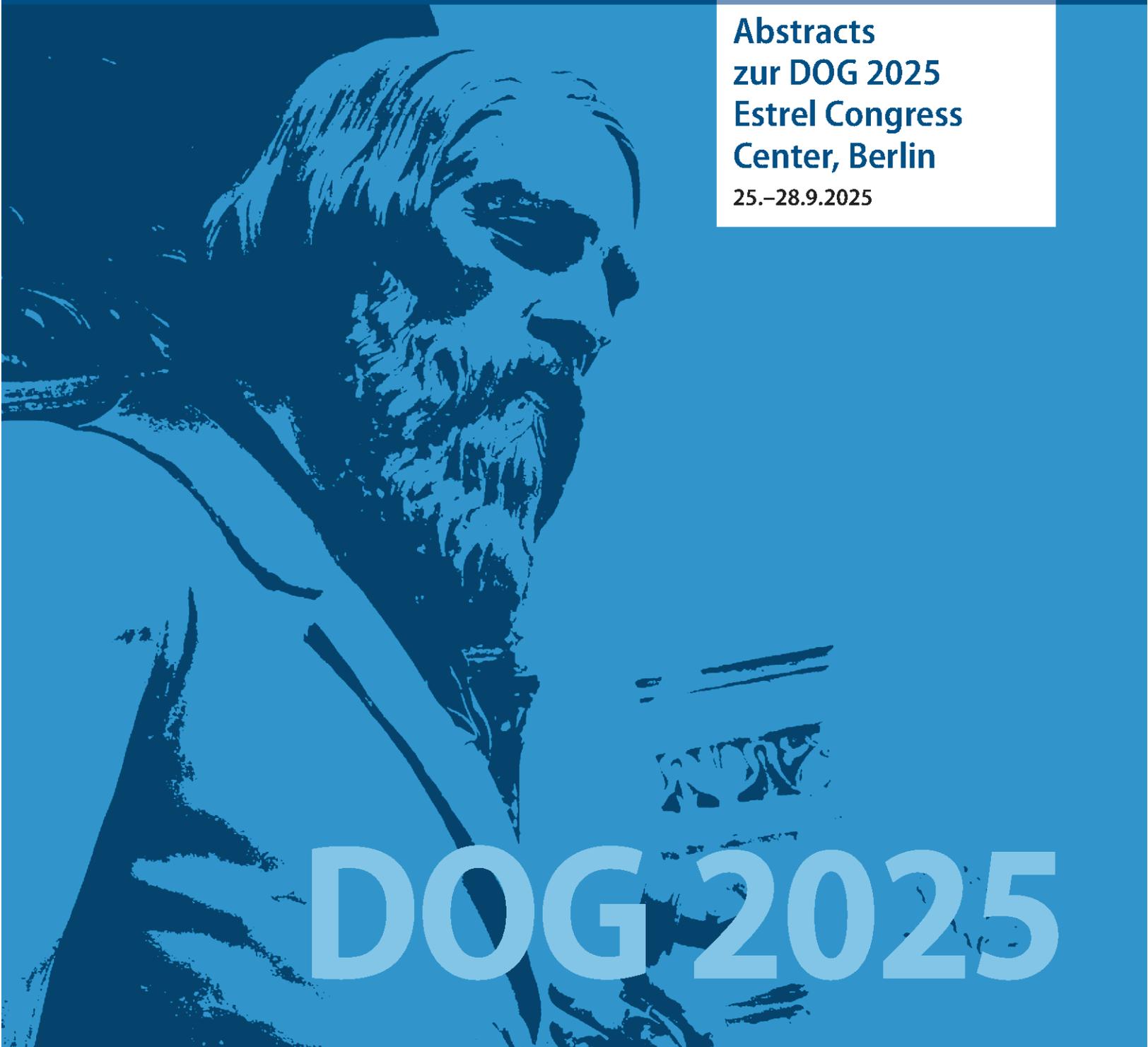
Die Ophthalmologie

Zeitschrift der Deutschen Ophthalmologischen Gesellschaft

**Abstracts
zur DOG 2025
Estrel Congress
Center, Berlin**
25.–28.9.2025

DOG 2025