Evaluation of colon cancer histomorphology: a comparison between formalin and PAXgene tissue fixation by an international ring trial.

The aim of our study was to evaluate the quality of histo- and cytomorphological features of PAXgene-fixed specimens and their suitability for histomorphological classification in comparison to standard formalin fixation. Fifteen colon cancer tissues were collected, divided into two mirrored samples and either formalin fixed (FFPE) or PAXgene fixed (PFPE) before paraffin embedding. HE- and PAS-stained sections were scanned and evaluated in a blinded, randomised ring trial by 20 pathologists from Europe and the USA using virtual microscopy. The pathologists evaluated histological grading, histological subtype, presence of adenoma, presence of lymphovascular invasion, quality of histomorphology and quality of nuclear features. Statistical analysis revealed that the reproducibility with regard to grading between both fixation methods was rather satisfactory (weighted kappa statistic (kw) = 0.73).
(95% confidence interval (CI), 0.41-0.94)), with a higher agreement between the reference evaluation and the PFPE samples (k w = 0.86 (95% CI, 0.67-1.00)). Independent from preservation method, inter-observer reproducibility was not completely satisfactory (k w = 0.60). Histomorphological quality parameters were scored equal or better for PFPE than for FFPE samples. For example, overall quality and nuclear features, especially the detection of mitosis, were judged significantly better for PFPE cases. By contrast, significant retraction artefacts were observed more frequently in PFPE samples. In conclusion, our findings suggest that the PAXgene Tissue System leads to excellent preservation of histomorphology and nuclear features of colon cancer tissue and allows routine morphological diagnosis.