E3 Enhancing Diagnostic Consistency in Lung Adenocarcinoma: Leveraging Multiple Artificial Intelligences for Standardized Pathological Diagnosis

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The subtype-based grading of lung adenocarcinoma (LADC) holds significant clinical importance; however, there have been reports of variability among pathologists in their diagnoses. In order to establish a standardized diagnostic approach for pathologists, we investigated the effectiveness of utilizing multiple artificial intelligences (AIs) based on diagnoses provided by numerous lung cancer experts. To conduct this study, two AI models were developed based on clustering and diagnostic tendencies of 18 pulmonary pathologists from 9 institutions. Subsequently, we collected 111 cases of LADC from an independent institution. These cases were compared against the diagnoses provided by the two AI models, and cases that differed from both AIs were further assessed by two expert pulmonary pathologists. The level of agreement between the two AI models, as observed in the 111 cases, was exceptionally high with κ-value of 0.88. Among the 111 cases, 31 were diagnosed differently from both AI models. The review by the two pathologists resulted in a change of diagnosis for 21 cases. Comparison of the modified diagnoses with the two AI models confirmed an enhanced concordance level (κ of 0.64 to 0.78). Our findings demonstrate that incorporating AI models that encompass diagnostic variations observed among lung cancer experts can effectively facilitate diagnostic standardization for general pathologists.