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**Title:** "Prediction of drug resistance in tuberculosis using deep learning algorithms"

**Authors:** Bokyoung Kim, Joon Beom Seo, Sung-Min Ahn, Hyun-Tae Shin, Hwa Sik Moon, Jae-Joon Yim, Chulhun Kang, Won-Jung Koh, and Changhwan Kim.

**This study proposes a deep learning-based method for predicting drug resistance in tuberculosis (TB) and evaluates its performance using publicly available TB genotype data. The study achieved an accuracy of over 80% in predicting drug resistance in TB.**

The study "Prediction of drug resistance in tuberculosis using deep learning algorithms" used deep learning algorithms to predict drug resistance in tuberculosis (TB). The authors developed a deep neural network model to predict resistance to six different drugs used in TB treatment, based on publicly available TB genotype data. The model was trained using a dataset of 14,385 drug susceptibility test results from the GenoType MTBDRplus assay, which detects mutations associated with drug resistance.

The deep neural network model consisted of three hidden layers, each with 512 nodes, and was trained using a binary cross-entropy loss function and the Adam optimizer. The performance of the model was evaluated using both cross-validation and an independent validation set, and it achieved an overall accuracy of 81.6% in predicting drug resistance in TB.

The study also compared the performance of the deep learning model with other machine learning algorithms, including decision trees, logistic regression, random forests, and support vector machines. The deep learning model outperformed all other machine learning models in predicting drug resistance in TB.

Overall, the study showed that deep learning algorithms can be used to accurately predict drug resistance in TB using genetic data, which has the potential to improve TB treatment outcomes. The authors also suggest that their model could be further improved by incorporating additional data, such as patient demographics and clinical data, to improve the accuracy of the predictions.

