

ORAL PRESENTATION

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O116. The EuResist expert model for customised HAART optimisation: 2010 update and extension to newest compounds

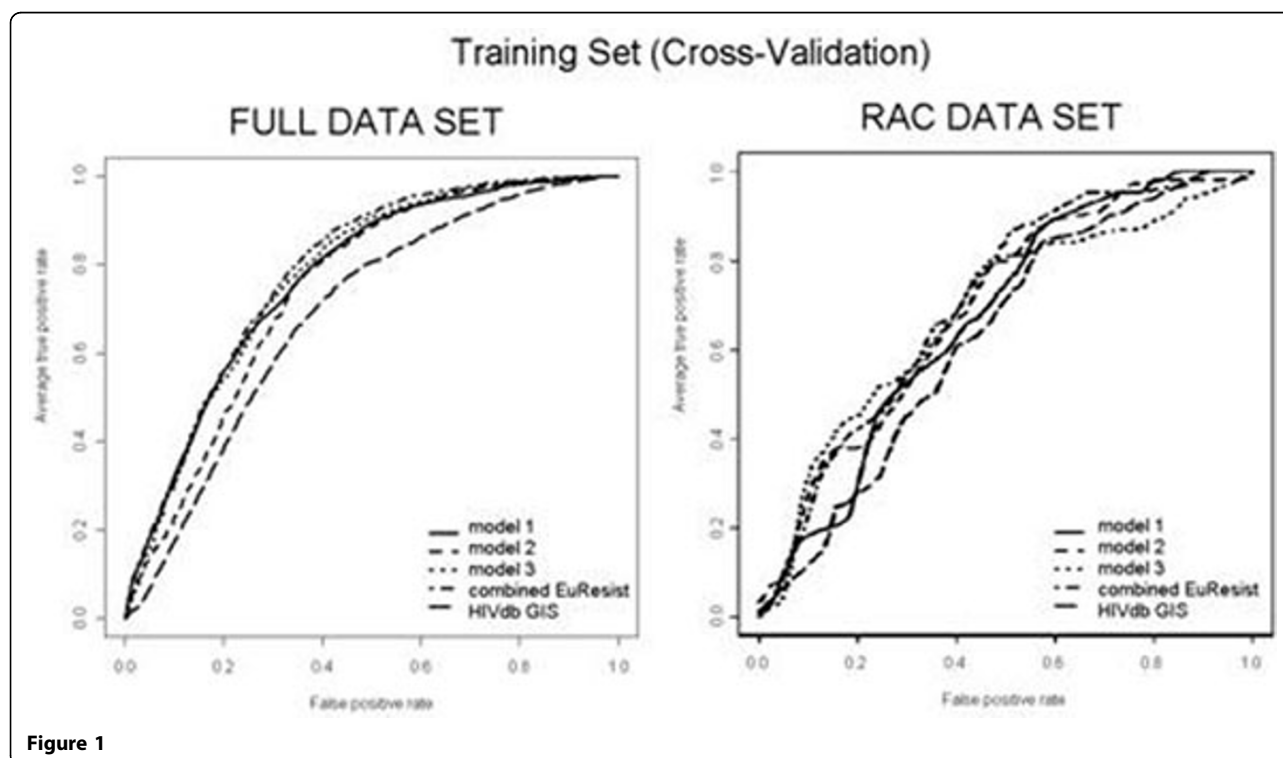
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Background

The design of an optimal highly active antiretroviral therapy (HAART) customised on patient's background and viral genotyping, is still a challenge. EuResist has been the first data-driven system to be implemented as

a free web-service for customised HAART optimisation, and was proven to be superior to all existing genotypic interpretation systems (GIS) since it takes into account not only genotype but multiple other variables.



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Data and methods

The EuResist database stores and updates periodically demographic, clinical, and genomic information of HIV + patients from several countries in Western Europe. The EuResist system is trained on treatment change episodes (TCE) drawn from the EuResist data base, composed of a new drug regimen with a baseline HIV-1 RNA load and a CD4+ count, a baseline viral pol genotype, demographic and previous treatment information. Each TCE is associated to an HIV-1 RNA measurement after 8 weeks, which is used for the definition of virological success (below 500 copies/ml or >2 Log10 reduction from baseline HIV-1 RNA). The system is a combination of three independent machine learning models (based on logistic regression, random forests, and Bayesian networks). The 2010 update has been trained on >5,000 TCE, composed of 20 FDA/EMEA approved nucleoside/tide, non-nucleoside, and protease inhibitors, including the recently approved compounds (RAC) tipranavir, etravirine and darunavir.

Results

The EuResist combined system performance in predicting the correct virological success of a TCE after 8-weeks (validation set, n=561) exhibited an area under the receiver operating characteristic (AUROC) of 0.8 (whereas Stanford HIVdb GIS assessed to 0.73, p=0.002). The inclusion of therapy history, clinical, and demographic covariates was shown to increase significantly prediction performance. In the subset of regimens containing RAC (n=151), the EuResist AUROC was 0.7 and Stanford HIVdb AUROC was 0.63, not allowing to assess a significant difference owing to the small sample size. See Figure 1.

Conclusions

Based on patient's information and virus genotype, the EuResist web-service ranks the most effective HAART regimens by the probability to achieve an undetectable HIV-1 RNA load after 8 weeks. Thus, it might be useful in clinical practice. The 2010 update includes also RAC and achieved fair performance, which is expected to increase with expanding training data.

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