

P1799 **ANTI-LOGIC: a new software for automatic recognition of phenotype and interpretation of antibiotic susceptibility testing**

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Background: Interpretation of Antibiotic Susceptibility testing (AST) by disc diffusion method is mainly performed by expert system such as European Committee on Antimicrobial Susceptibility Testing (EUCAST) by the measurement of inhibition zone diameter by commercial systems to correlate diameter of inhibition to MIC and clinical breakpoints. Although these systems are reproducible and powerful, they cannot interpret the whole phenotype of a bacterium without expertise of a clinical microbiologist. Here, we have developed and evaluated a new software called ANTI-LOGIC that is able to compare photos to an existing database of photos with well-known interpreted phenotype according to EUCAST rules for the interpretation and the automatic determination of the phenotype of AST.

Materials/methods: This software was composed of an algorithm able to recognize specific phenotypes thanks to a dedicated learning database composed of interpreted photos classified per phenotype including CARBA, ESBL, HPL, CIP-R, STX-R, DO-R, CIP_DO-R, CIP_STX-R, CIP_DO_STX-R, DO_STX-R, and WILD based on the susceptibility of a panel of 16 antibiotics. We focused our study on the most frequent Enterobacteriaceae especially on *Escherichia coli* to interpret and to recognize these 11 listed phenotypes.

Results: For the proof of concept, we have tested a total of 1000 photos of *E. coli* with a panel of 16 antibiotics (square agar) and with a learning database composed of 600 photos representative of the eleven phenotypes. ANTI-LOGIC software was able to automatically interpret correctly the phenotype of 95,6% of the photos including photos took by smartphone and by dedicated scanners with a specificity of 100%. This phenotype recognition system based on a prior learning database is in progress to be extended for the most bacterial species encountered in hospital settings.

Conclusions: To the best of our knowledge, this is the first described automatic software able to automatically interpret rapidly AST images obtained by disc diffusion assay by comparison of a database of photos without the need of human intervention and possible misinterpretation. ANTI-LOGIC software is a friendly software that could be used with any system of acquisition of images, including smartphones that is useful for direct AST interpretation within few seconds.