New genetic understanding of lack of adherence to medication will aid in the identification of patients at risk

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How strictly patients follow a prescribed drug treatment (drug adherence) is clearly important if the therapy is to have maximum effect. A number of things can affect adherence, including behavioural

and socioeconomic factors, but to date there have been few investigations into the role played by genetics. Now, research to be presented at the annual conference of the European Society of Human Genetics today has thrown new light on the potential biological mechanisms that can affect adherence to treatment.

Mattia Cordioli, MSc, a Ph.D. student at FIMM, the Institute for Molecular Medicine Finland, Helsinki, Finland, and colleagues examined data from the FinnGen study, from Finnish nationwide health registries, and the national drug purchase registry to try to uncover determinants of adherence across different medication groups. Using information on the date that the individual purchase was made, and the quantity purchased, they were able to define adherence by dividing the initial quantity by the number of days, with reference to the prescribed daily dose.

The researchers then carried out a genome-wide association study (GWAS) to see if genetic variants might help explain variation in adherence. "We used these results to see whether we could find a correlation between adherence and other traits that are controlled by multiple genes, rather than just one (polygenic traits). We found that a positive genetic correlation between adherence and other traits, for example, educational achievement, meant that individuals with a genetic predisposition for higher educational achievement tended to be more adherent. On the other hand, those with a genetic predisposition for risk-taking were less adherent to the medication schedule,' says Mr Cordioli.

The researchers also found that, while a genetic predisposition for higher systolic blood pressure was correlated with increased adherence to blood pressure medication, there was no such association in patients with such a predisposition for higher LDL (bad) cholesterol and statin adherence. "This is interesting and may reflect the need for better feedback on the action and efficacy of a particular medication in order to improve

adherence," says Mr Cordioli. Drug adherence was also positively correlated in patients with a genetic predisposition for type 2 diabetes and higher body mass index, suggesting that patients in higher risk categories tend to be more adherent.

Demographic and socioeconomic factors remain important, though they are probably rather more related to access to treatment than compliance with a drug regime. But studying individual genetics can unveil possible biological mechanisms affecting adherence. Their sample size to date has not been large enough for them to look at medications that are less commonly prescribed to see whether specific biological factors are involved in adherence there, too, but the researchers suggest that it would be worthwhile to do so.

"Our research has shown that adherence pertains more to an individual's predisposition to a particular behaviour rather than to underlying biological factors such as the adverse effects of a particular drug. We are hopeful that the identification of those patients who are less likely to adhere to drug therapy may encourage and facilitate the design of effective information campaigns directed at them," Mr Cordioli says.

"Along with the advances in genetic testing that can show how an individual responds to drugs and therefore allow the prescription of tailored treatment, we believe that further biological investigations into individual adherence may make a valuable contribution to the design of new standard clinical practice in the future", he will conclude.

Chair of the ESHG conference, Professor Alexandre Reymond, Director of the Center for Integrative Genomics, University of Lausanne, Lausanne, Switzerland, said: "Adherence to a prescribed treatment has not previously been looked at from a genetic point of view and finding that this is potentially more linked to behavior than to adverse effects gives us clues on where the health system should put its efforts to gets

the best results."

Provided by European Society of Human Genetics