The first 10-year population-based coronary disease genome-wide association study (GWAS) in more than 100,000 participants to personalize cardiovascular prevention in Spain.

A project of the CORDELIA Study

(Collaborative cOhorts Reassembled Data to study mEchanisms and Longterm Incidence of cArdiovascular diseases)

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PURPOSE

Southern Europe is lacking sufficiently **large cohorts and DNA biobanks** to organize **genome-wide association studies (GWAS)** with **cardiovascular disease (CVD)**, which come mainly from **case-control** studies.

1) To identify the **genetic characteristics** associated with the **10-year incidence of CVD** in the Spanish population using a **GWAS on ~102,000 participants** form **24 Spanish cohorts** already created, followed and duly combined.

2) To test new **10-year genetic risk score (GRS) for CVD** adapted to the characteristics of the Spanish population, and to validate previously proposed GRS.

METHODS

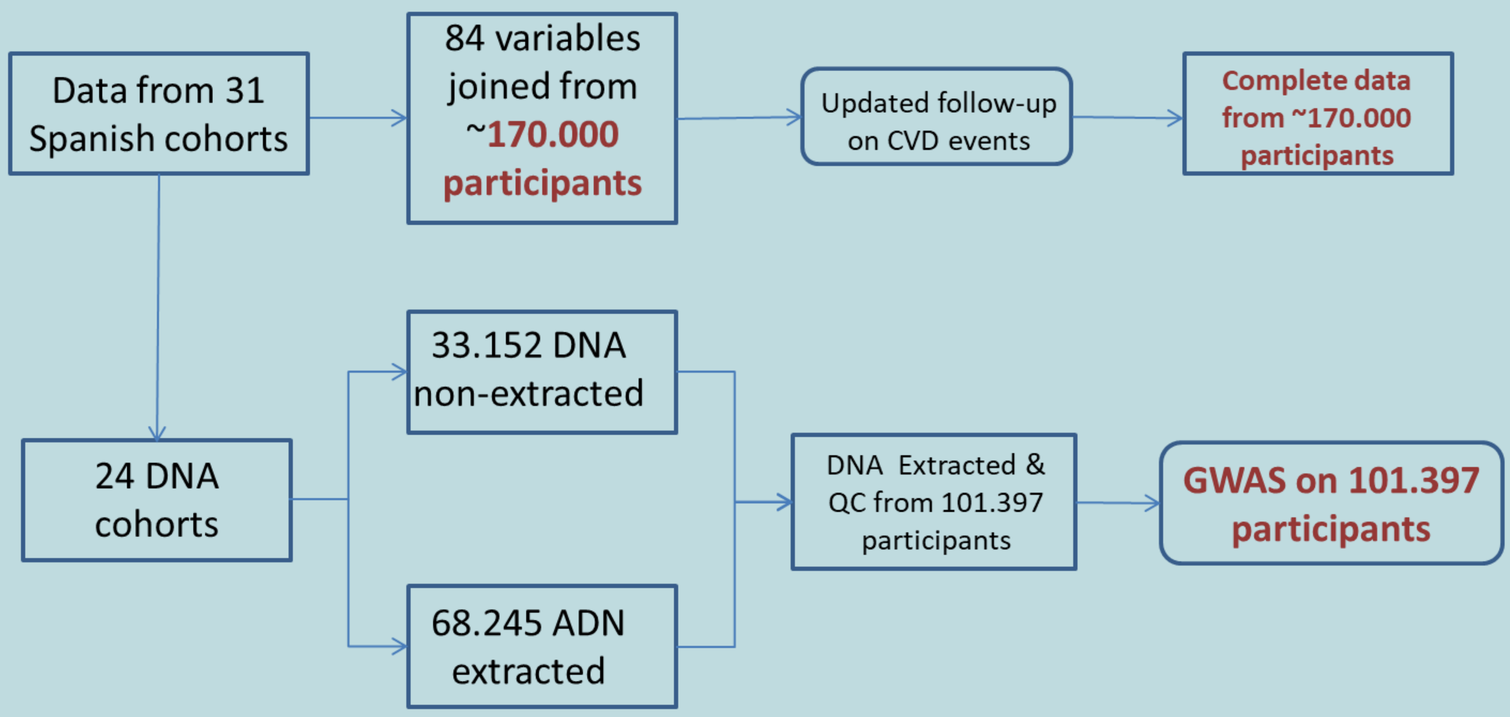
Study design and population

- A collaborative and **multicenter prospective cohort of 31 population-based** pooled cohorts recruited in Spain in the **last 30 years**, with **more than 167.000 participants**, of whom **> 102.000 have DNA** samples still available.
- Spanish natives or residents **35 and 84 years old**, 50% women, free of acute myocardial infarction, stroke or peripheral arterial disease at the time of recruitment.

Statistical analyses

- **Data management**: data collection, data merging, quality control reports, ...
- **Genetic analyses:** Genome Wide Association (GWAS) of observed and imputed SNPs, multiple testing, population stratification adjustment, Hardy-Weinberg Disequilibrium, **Genetic and Polygenetic Risk Scores** (GRS, PGR), ...
- **Predictive models:** assessment of prediction capacity and accuracy of multivariate linear, logistic regression and Cox models.
- **Elaborate reports** of intermediate and final results.

Work plan



CONCLUSIONS

Student will:

- Clean and prepare complex data from big multicentric cohort study.
- Perform Genome-Wide-Association Study on more than 100.000 individuals.
- Evaluate prediction capacity of genetic scores using multivariate regression models and survival techniques.

CORDELIA CVD GWAS is:

- Feasible at 3 years
- Cost-effective
- Promising

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