The RUMIGEN project : "Towards improvement of ruminant breeding through genomic and epigenomic approaches" (2021-2026) has started!

The Kick-off meeting of the H2020 RUMIGEN project (H2020-SFS13 call "Genome and epigenome enable breeding in terrestrial livestock") was held via teleconference - to comply with the current COVID-19 restrictions – from 30th June to 2nd July 2021. The RUMIGEN project involves 18 partners from nine EEC countries and a budget of 7M€. Its aim is to improve bovine genomic selection using of three levers: quantitative genetic, genome editing and epigenetic. Besides these biological levers, RUMIGEN also involved a lever in human and social sciences in order to propose selection methods and objectives accepted by European citizens. The genetic level aspires to enlarge the selection criteria, with for example environmental effects, biodiversity preservation, in order to increase animal resilience towards climatic changes. The genome editing level will explore domains into which genome editing might be useful for Ruminants and will assess its potential impact on *de novo* mutation rate and its efficiency compared to other classical breeding schemes. The epigenetic level is aiming at developing an epigenetic microarray, determining methylation profile of DNA in various tissues and breeding conditions and at integrating these epigenotyping data to refine genomic selection equations. Overall, RUMIGEN aims at developing new breeding strategies to help Ruminants to adapt to climatic changes and to its deleterious effects in a demarche that will closely associate the civil society.

More sustainable breeding programs and linked technologies need to be in line with social demand and to take into account genetic diversity as well as required adaption to climate change. Towards these aims, RUMIGEN will ensure engagement of a variety of stakeholders to assess social perception of breeding objectives and related technologies in ruminants. It will define "rooms of acceptance" which will be implemented in sustainable breeding scenarios that will then be assessed through multi-actor panels. To define new breeding programs, RUMIGEN, which brings together partners representing pan-European leaders on ruminant breeding, will question trade-offs and pleiotropic effects through adaptation to environmental stressors such as heat stress. Cosmopolitan and local dairy cattle breeds will be analyzed evaluating mid to long term effects as well as impact on next generation (fetal programming). This work will rely on large-scale data from commercial farms combined with climatic data, taking advantage of the large panel of situations across Europe and of a unique design involving half-sister cows raised in contrasted conditions, Denmark and India. Diversity will be also studied with new breed genome assemblies. Methods will be developed to account for rare alleles and to maintain diversity. An epigenotyping platform will be designed to (i) explore sperm epigenome influences on bull fertility and progeny, (ii) decipher underlying mechanisms of epigenetic inheritance and (iii) evaluate how much epigenetic biomarkers improve phenotype prediction. RUMIGEN will answer questions on genome editing specificity and safety issues, assessing its potential to preserve genetic diversity and increase genetic gains. Overall, RUMIGEN will develop models combining genomics, epigenomics and biotechnologies to improve genomic selection, preserve genetic biodiversity and avoid genetic load. Improved phenotype prediction will pave the way to new management indexes for precision farming.

To find out more about RUMIGEN project, follow our social media accounts (LinkedIn, Twitter and Facebook), or visit the cordis website. A project website will be set up soon.

Selfie Wall

let's go!