

The Swedish Twin Registry - STR

HISTORY

- Started by Lars Friberg and Rune Cederlöf in the late 1950s
- Church records of twin births 1886-1925
- All identified same sex twins contacted during the 1960s
- Today: all alive Swedish born twins aged 10 or more have been contacted and invited to participate

STR leadership organization

- STR steering group:

- Patrik Magnusson (director)
- Nancy Pedersen
- Paul Lichtenstein
- Martin Schalling
- Catarina Almqvist
- Maria Feychting
- Johan Askling
- Sofia Carlsson
- Magnus Johannesson (representative from the National Council)

- National council:

Representatives from:

- Lund University
- Göteborg University
- Örebro University
- Jönköping University
- Linköping University
- Umeå University
- Handelshögskolan Stockholm

Funding

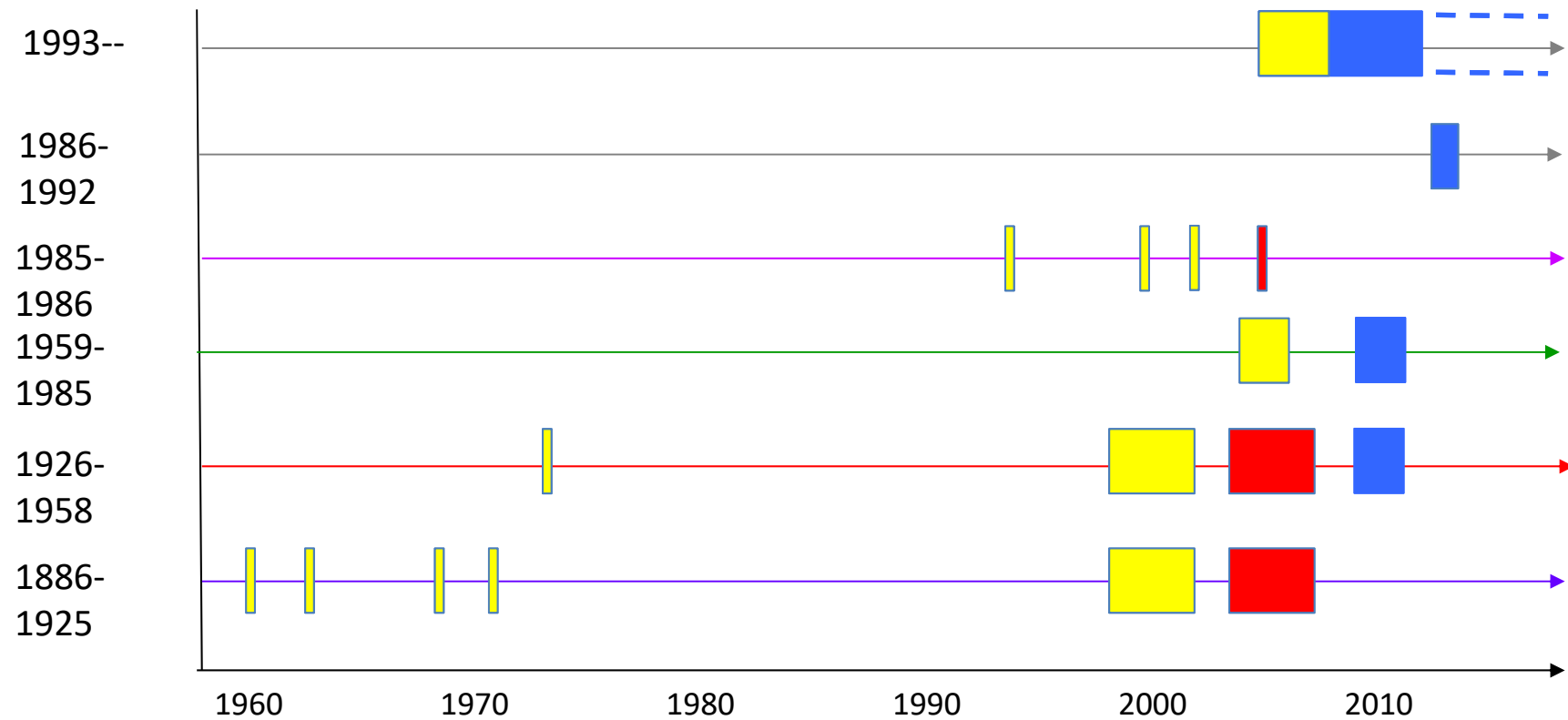
- Run as a KI core facility
- Economic support from the Swedish Research Council 2018-2022



Full-cohort contacts and Bio-sampling



Birth cohort



Current invitation/recruitment into STR

- Since 2004 we contact parents to Swedish born twins when the twins turn 9 years of age
- Invitation to participate in STR – broad consent
- Screen for somatic and mental health problem
- High participation rate (70%)
- Follow-ups at 15, 18 and 24 years

Recent landmarks

- *All* adult Swedish born twins have now been contacted for participation when 10 years or older with general questionnaire and DNA donation request
- 200 000 in the register
- 160 000 have zygosity
- The largest twin register in the world

Data

- Paper questionnaires
- Telephone interviews (SALT 1998-2002)
- Web questionnaires (2005 and onwards)
- Health check-ups (TwinGene, CATSS, SATSA)
- Health registers (National Board of Health and Welfare)
- DNA (N=60 000)
- GWAS (N=40 000)
- Serum (N=15 000)
- Blood biochemistry (TwinGene, SATSA)
- Computer tests (cognition, time-consistency)

GWAS (Illumina)

- Older twins, born 1911-1958:
 - N = 20 000
 - Genotyped in Uppsala (SNP&SEQ Tech) 2008, 2011, 2015
- Twins born 1959-1993 (ongoing)
 - N = 13 300
 - Genotyped in Uppsala (SNP&SEQ Tech) 2018
- Younger cohort, born 1994 and onwards (ongoing)
 - N = 17 000
 - Genotyped in Uppsala (SNP&SEQ Tech) 2015, 2018

Serum measurements

- All of TwinGene (N=12600)
 - HDL, LDL, TC, TG, CRP, Hb, HbA1c, Glucose, ApoA1, ApoB
 - ACPA (Lars Klareskog)
 - Total IgA (Lennart Hammarström)
 - Creatinine, Cystatin C (Per Svensson)
 - Pepsinogen I/II, H.pylori (Weimin Ye)
- Subsets
 - LpPla2, aPC, aOxCl (Ulf de Faire, Johan Frostegård)
 - PCSK9, APOC3 (Ferdiand Van T Hooft)
 - Proteomics (SciLife Lab Protein atlas)
 - Metabolomics (HPLC Mass spec)

Serum is an available but limited resource!

Epigenetics in twins

- Key observations:
 - Gene expression differs between cell types within individuals
 - Discordant MZ twins
 - Gene expression influenced by environment
- Epigenetic measures:
 - DNA methylation, histone acetylation etc.
- Confounding from Genetics:
 - MZ twins may provide remedy!

Apply for new STR projects

- STR steering committee meets 4 times/year
- Short application + CV + ethics permission

Where?

<https://ki.se/en/research/swedish-twin-registry-for-researchers>

- Metadata + questionnaires accessible for free
- Blood, serum and DNA stored in biobank
- Phenotypes