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PyCoStat: Pycnogenol®, coenzyme Q10 and patients treated with statins

Submission date 16/02/2023	**Recruitment status** Recruiting	[_] Prospectively registered [_] Protocol
Registration date 10/03/2023	**Overall study status** Ongoing	[_] Statistical analysis plan [_] Results
Last Edited 03/09/2026	**Condition category** Circulatory System	[_] Individual participant data [X] Record updated in last year

Plain English summary of protocol

Background and study aims
Dyslipidemia, an imbalance of fats in the blood, is one of the most common modifiable risk factors for cardiovascular disease, in which statins are recommended as first-line pharmacological therapy. Treatment with statins reduces the risk of heart attack and stroke in most patients with elevated low-density lipoprotein (LDL) cholesterol levels and in most high-risk patients with atherosclerotic cardiovascular disease. Statins are well tolerated in most adult patients with a low incidence of minor adverse effects. However, they are associated with various side effects on skeletal muscle - from mild to severe. The mechanism of statin-associated muscle symptoms (SAMS) is currently unclear, but changes in blood coenzyme Q10 (CoQ10) levels may be involved in the pathological process. CoQ10 is an intracellular antioxidant that protects membrane phospholipids, mitochondrial membrane proteins, and LDL particles from oxidative damage caused by free radicals. Statins, by their inhibitory effect on the cholesterol synthesis pathway, can reduce not only cholesterol synthesis but also the synthesis of other molecules that arise from mevalonate, including CoQ10. Pycnogenol® is a standardized pine bark extract of Pinus pinaster Aiton and shows different effects in humans after oral administration, e.g. antioxidant, anti-inflammatory, antiallergic, hypolipidemic etc., which have been demonstrated in many clinical studies. The aim of this study is to investigate how 3 months of daily administration of Pycnogenol® (150 mg/day) by patients treated with statins affect CoQ10 levels in the blood, the serum lipid balance, LDL and high-density lipoprotein (HDL) subfraction levels, lipoprotein (a) (Lp(A)) and apolipoprotein-A1 (Apo-A1) levels, level of oxidative stress, the antioxidant status of the patients and adverse effects of statins related to muscles – weakness, pain, tiredness.

Who can participate?
Adults aged 19 to 60 years who are being treated for the first time with statins

What does the study involve?
In this study, the effects of Pycnogenol® (PYC- group) on the status of patients with dyslipidemia, who are treated with statins for the first time will be compared with placebo (PL-group). Patients who meet the inclusion criteria, after initial medical investigation (complete medical history and examination, questionnaire about quality of life) will be allocated to one of the two arms of the project (PYC or PL-group) in a ratio of 1:1, according to a computer-

generated random sequence (visit 1). The randomisation will be performed by a statistician, who will have no contact with the participants. Patients will be administered 150 mg Pycnogenol® or Placebo for 3 months. After the intervention period, patients will be examined by the doctor and patients will fill out a questionnaire about quality of life (visit 2). At both visits, blood samples will be taken. The research team and participants will be unaware of the group assignments.

What are the possible benefits and risks of participating?
Participants who receive Pycnogenol® may benefit from the improvement of statin-associated muscle symptoms, quality of life and antioxidant status. There are no known risks to participants taking part in this study.

Where is the study run from?
1. Institute of Medical Chemistry, Biochemistry and Clinical Biochemistry, Comenius University, Bratislava (Slovakia)
2. 1st Department of Internal Medicine, Faculty of Medicine, Comenius University and University Hospital, Bratislava (Slovakia)
3. Vitacare, s.r.o., Internal Medicine Outpatient Clinic, Modra (Slovakia)

When is the study starting and how long is it expected to run for?
May 2022 to December 2027

Who is funding the study?
Horphag Research Ltd (Switzerland)

Who is the main contact?
RN Dr Országhová Zuzana, PhD, zuzana.orszaghova@fmed.uniba.sk (Slovakia)

Contact information

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Study information

Scientific Title
Effect of maritime pine bark extract (Pycnogenol®) on CoQ10 levels and wellbeing in patients treated with statins

Acronym
PyCoStat

Study objectives
The aim of the study is to investigate how the oral administration of Pycnogenol® (150 mg/day) by patients treated with statins affects coenzyme Q10 (CoQ10) levels in the blood, the serum lipid profile, low-density lipoprotein (LDL) and high-density lipoprotein (HDL) subfractions, lipoprotein (a) (Lp(A)) and apolipoprotein-A1 (Apo-A1) levels, level of oxidative stress and antioxidant status of the patients and adverse effects of statins related to muscles – weakness, pain, tiredness.

Ethics approval required
Old ethics approval format

Ethics approval(s)
1. Approved 24/10/2022, Ethics Committee of Faculty of Medicine, Comenius University and University Hospital in Bratislava (Old Town Hospital, Mickiewiczova 13, 81369 Bratislava,

Slovakia; +421 2 57 290 495; jan.pecenak@sm.unb.sk), ref: 69/2022
2. Approved 21/03/2025, Ethics Committee of Bratislava Self-Governing Region (Sabinovská 16, 82005 Bratislava 25, Slovakia; +421 2 48 264 260; juraj.steklac@region-bsk.sk), ref: not provided

Primary study design
Interventional

Study design
Interventional double-blinded randomized placebo-controlled study

Study type(s)
Quality of life

Health condition(s) or problem(s) studied
Patients treated with statins for the first time

Interventions
The randomization will be performed by a statistician, who will have no contact with the participants. The research team and participants will be unaware of the group assignments and the envelope with assignments will be opened only after analyses are finished and databases are completed and locked.

Participants randomised into active or placebo groups will be required to take three capsules a day for 3 months:
1. Active intervention: 50 mg of a standardised extract from pine bark – Pycnogenol® per capsule
2. Placebo intervention: maltodextrin without the active substances, identically packaged as active.
Both interventions will be prepared by Horphag Research Ltd. (Geneva, Switzerland).

As part of the project, patients make two visits to the doctor, they will be examined, blood will be taken and a quality of life questionnaire will be undertaken.

Intervention Type
Supplement

Primary outcome(s)
1. Quality of life and side symptoms of statin treatment measured using the 12-Item Short Form Survey (SF-12) questionnaire at baseline and after 3 months of intervention
2. CoQ10 levels in the blood HPLC at baseline and after 3 months of intervention

Key secondary outcome(s)
1. Basic and specific biochemical parameters - fasting glucose, creatinine, urea, lipid profile (total cholesterol, HDL-cholesterol, LDL-cholesterol, TAG), CRP, apolipoprotein A1, lipoprotein(a) measured at certified Laboratory of Clinical Biochemistry using Roche tests at baseline and after 3 months of intervention
2. HDL and LDL subfractions measured using an electrophoretic Lipoprint system at baseline and after 3 months of intervention
3. Total antioxidant capacity of plasma measured using the TEAC method and the levels of selected antioxidants (alpha-tocopherol, gamma-tocopherol, beta-carotene, glutathione) in thrombocytes, blood and plasma measured using spectrophotometric or fluorometric methods at baseline and after 3 months of intervention

4. The parameters of oxidative damage to lipids (oxLDL, lipoperoxide, TBARS) in plasma measured using spectrophotometric methods at baseline and after 3 months of intervention
5. Activities of PON 1 (arylesterase and lactonase) using spectrophotometric methods at baseline and after 3 months of intervention
6. Activity of creatine kinase (isoenzyme MM) measured at certified Laboratory of Clinical Biochemistry at baseline and after 3 months of intervention

Completion date
31/12/2027

Eligibility

Key inclusion criteria
Patients with different diagnoses (e.g. CVD, hypertension) who will be treated with any type of statin for the first time and in a dose that will be determined individually based on the established overall CV risk with the aim of achieving target lipid values

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
19 Years

Upper age limit
60 Years

Sex
All

Total final enrolment
0

Key exclusion criteria
1. Aged < 19 and > 60 years old
2. Acute myocardial infarction (IM) or less than 3 months after IM
3. Active oncological disease
4. Hypothyroidism
5. Diabetes Mellitus
6. Chronic inflammatory disease (e.g. rheumatoid arthritis)
7. Unable/unwilling to sign an informed consent
8. Unable/unwilling to provide samples of biological material as needed

Date of first enrolment
06/03/2023

Date of final enrolment
30/09/2027

Locations

Countries of recruitment
Slovakia

Study participating centre
Comenius University and University Hospital
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Sponsor information

Organisation
Horphag Research (Switzerland)

ROR
https://ror.org/003n34405

Funder(s)

Funder type
Industry

Funder Name
Horphag Research (Switzerland)

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study will be available upon request from zuzana.orszaghova@fmed.uniba.sk

IPD sharing plan summary
Available on request