

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

<b>Submission date</b> 16/02/2023	<b>Recruitment status</b> Recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
<b>Registration date</b> 10/03/2023	<b>Overall study status</b> Ongoing	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 18/09/2025	<b>Condition category</b> Circulatory System	<input type="checkbox"/> Individual participant data <input checked="" type="checkbox"/> 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)

When is the study starting and how long is it expected to run for?

May 2022 to December 2026

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

### Type(s)

Principal investigator

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## Additional identifiers

### Clinical Trials Information System (CTIS)

Nil known

### ClinicalTrials.gov (NCT)

Nil known

### Protocol serial number

Nil known

## 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

## **Study design**

Interventional double-blinded randomized placebo-controlled study

## **Primary study design**

Interventional

## **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**

31/12/2026

## 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

**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**

30/09/2026

## Locations

**Countries of recruitment**

Slovakia

**Study participating centre****Comenius University and University Hospital**

1st Department of Internal Medicine

Faculty of Medicine

Mickiewiczova 13

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**Study participating centre****Comenius University**

Institute of Medical Chemistry, Biochemistry and Clinical Biochemistry

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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](mailto:zuzana.orszaghova@fmed.uniba.sk)

**IPD sharing plan summary**

Available on request