



Researcher / Enterprise

Profile form

FP7 – Health

(for Partners aiming to join a consortium)



Date 29 08 09

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CONTACT DETAILS

Research organisation / Enterprise	Research organisation
Organisation Name	Tbilisi State Medical University; Ekvator Ltd (SME)
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Researcher / Contact person	Researcher
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ORGANISATION TYPE

Research organisation type	<input checked="" type="checkbox"/> Research Organisation	Is your company a Small and Medium Sized Enterprise (SME*)?	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
	<input checked="" type="checkbox"/> Company			
	<input type="checkbox"/> Other	Number of employees:	42	

Description of research activity:

TSMU develops its current research activities for investigation of effects of excessive dietary fiber intake on atherosclerotic vascular damage in CHD:

- Elaborate and implement custom dietary assessment tools including dietary history questionnaire, nutrient intake and calorie consumption for applying in research and practice;
- Strengthen the current research infrastructure for measurement of biological markers of inflammation (C-reactive protein, cytokine system constituents – IL-6), endothelial dysfunction (nitric oxide release, tissue plasminogen activator), thrombosis (plasma coagulation factor VII), bile acid and HMG CoA reductase system homeostasis through equipment of research facility and implementing of advanced methodologies;
- Develop activities for evaluation of effects of excessive dietary fiber intake on endothelium layer damage or atherosclerotic artery dysfunction applying the measurement and adjustment of biological markers of inflammation, endothelial dysfunction, thrombosis and known indices of arterial function in clinical model of CHD.
- Explore the possible bridges for mediation of effects of excessive dietary fiber intake through testing of bile acid and HMG CoA reductase system homeostasis.
- Strengthen the existing knowledge about the role of dietary modifications and particularly dietary fiber intake in management of CVD and implement professional education tools for human atherosclerosis study using the new scientific developments.

Effects of dietary fiber on exposure of major conventional risk factors of common non-communicable diseases (NCDs), and particularly, on cardiovascular diseases (CVD) risk factors was studied during the last two decades everywhere. Intakes of optimal amounts of dietary fiber (up to 30g/daily) emphasis the strategy for reduction of refine carbohydrates'



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and fats' consumption. As the result dietary fiber intake modifies common CVD risk factors such as hyperlipidemia, hyperglycaemia, hypertension or metabolic syndrome. These advances in public health research set the dietary fiber as the main constituent of healthy diet and nutrition toward the risk reduction in whole population and high risk groups. Evidence from these research developments could already form recommendations those are included in preventive guidelines.

Despite of valuable achievements in public health research and studies of dietary fiber effects on exposure of common CVD risk factors, there are only few targeted investigations displaying the effects of dietary fiber on markers of a human atherosclerotic disease and pathology of atherosclerosis. There also are inconsistent evidence about possible metabolic pathways and molecular bridges for explanation of direct effects of dietary fiber on endothelium layer damage or atherosclerotic artery dysfunctions.

Current developments in food and nutrition technology have provided opportunities for supplying of multiform or simple functional foods rich in fiber. Grain food products and particularly wheat bran based foods consumed anywhere can serve as the model treatment agent. Using of wheat bran products can also insure excessive intake of dietary fiber together with other components of the balanced diet and food safety.

Coronary Heart Disease (CHD) as the prevalent atherosclerotic disease can be chosen as the clinical model of the pathology. It is the prevailed cause of disability, death and disease burden, especially in developing countries. Following the inflammation theory of atherosclerosis expression of relevant biological markers of inflammation (C-reactive protein, cytokine system components – IL-6), endothelial dysfunction (nitric oxide realise, tissue plasminogen activator) and thrombosis (plasma coagulation factor VII) may serve as proxy indicators of effects of excessive intake of dietary fiber. Moreover, using the indices flow-mediated dilatation (FDM), aortic pulse wave velocity (aPWV) and intima-media thickness (IMT) may also serve for evaluation of the effects.

Metabolic pathways describing effects of excessive intake of dietary fiber and possible molecular bridges linking these metabolic changes with pathological processes in endothelium layer and whole artery wall are another side of research requirements. Effects of dietary fiber are developed through the intestinal digestion process which is leaded by hepatobilliary system. Plant viscous fiber is considered as natural stimulator of bile production and activates hepatic intestinal path of bile acid homeostasis. Cholesterol is the main component of bile. Thus, hepatocellular HMG CoA reductase system activity as well as homeostasis of bile acid production and transportation might be considered as the trigger site for development of effects of excessive dietary fiber intake. These components of hepatocellular homeostasis contribute to the development of oxidative stress of endothelial layer and molecular pro-inflammatory response on atherosclerotic vascular damage.

Some common factors of atherosclerosis such as hypertension, hypercholesterolemia, diabetes mellitus, smoking, obesity/fatness, dishormonal status (pre-, post menopause, oestrogen drug treatment) as well as treatment with HMG CoA reductase inhibitors (statins) may mediate main confounding effects independently of together with dietary modification (excessive consumption of dietary fiber). They should be adjusted or kept under the control. This will allow excluding of valuable biases during the research. Therefore, pure clinical model of a atherosclerotic disease, particularly CHD should be assigned for research. Middle aged, non-smoker and non-diabetic men with established CHD might be considered as such clinical model for research object.

Former participation in an FP European project?

YES NO

Project title / Acronym:

Activities performed:

* Your enterprise is an SME if:

- it is engaged in **economic activity**
- it has **less than 250 employees**
- it has either an **annual turnover not exceeding €50M**, or an **balance sheet total not exceeding €43M**
- it is **autonomous**



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For the definition of SMEs, look at:

http://ec.europa.eu/enterprise/enterprise_policy/sme_definition/index_en.htm

EXPERTISE/COMMITMENT OFFERED

Keywords specifying the expertise:

dietary fiber, hepatic intestinal path of bile acid homeostasis, Original technologies, wheat bran products, atherosclerosis, Coronary Heart Disease, biological markers of inflammation, endothelial dysfunction, thrombosis, proxy indicators

Description of the expertise:

Scientific research in TSMU for exploring effects of dietary fiber on cholecystic pathogenesis determined by microbial and HBV infection of the gallbladder wall and contents comes from late 80th of last century. Investigations revealed that cholecystic pathogenetic impact of microbial and HBV infection of gallbladder resulted in changes of natural physical and chemical properties of bile. It had caused increasing lithogenesis and formation of bile concretions. It was also displayed that diet rich in plant dietary fiber can improve and maintain physical and chemical properties of gallbladder's bile in cases of microbial and HBV infection of gallbladder wall and contents.

These can prevent cholecystic pathogenesis related to development of cholelithiasis. Explored effects of dietary fiber were related to increasing in bile production and intensification hepatic intestinal path of bile acid homeostasis.

From 1996 development of original technologies for processing and provision of wheat milled food products rich in plant dietary fiber was developed, which have made possible to preserve all beneficial properties and useful qualities of dietary fiber and avoid all properties related to complications and contraindications from gastro-intestinal tract those might be indicated by roughness of wheat bran peel usually accompanies consumption of simple wheat bran products. The technology model resembling a native process of dietary fiber digestion by human gastro-intestinal tract was developed. Based on this original technologies wheat bran milled products for dietary fiber supplementation were performed: dietary fiber enriched bread, meat product enriched with dietary fiber from wheat bran and mussel on the base of wheat bran.

Original technologies and single procedures for product processing developed through research developments got five invention patents (1997-2007) under Georgian laws and regulations from the Georgian National Centre for intellectual property. Invention application under the "Medical Preventive Food combination and Food products on its Basis" was done to the World Intellectual Property Organization (WIPO) where it was published on December 4, 2008.

http://v3.espacenet.com/publicationDetails/biblio?DB=EPODOC&adjacent=true&locale=en_gb&FT=D&date=20081204&CC=WO&NR=2008146050A1&KC=A1

Scientific research activities for atherosclerosis in TSMU on go already decades. Investigations of genetic aspects of atherosclerosis and possible pleiotrophic effects in atherosclerosis, research activities for CVD prevention strategy particularly population-based interventions for control of hypertension, hyperlipidemia and diabetes type II is developed in recent years.

Currently TSMU has access to extensive expertise within clinical medicine, imaging (echo, radiology), biochemistry and immunology.

TSMU has close collaboration with other relevant research institutions of Georgian Academy of Sciences, university centers, health providers operating coronary care units and professional associations.



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Commitment offered

- Research
 Demonstration
 Training
 Technology
 Dissemination
 Other:

Interested in participation in Project types

<input checked="" type="checkbox"/> Large-scale integrating collaborative project	<input checked="" type="checkbox"/> Small or medium-scale focused research collaborative project	<input checked="" type="checkbox"/> Targeted to SMEs	<input type="checkbox"/> Other (Marie Curie Actions, ERA-NET...):
<input checked="" type="checkbox"/> Coordination and Support Action	<input type="checkbox"/> Network of Excellence	<input checked="" type="checkbox"/> Research for the benefit of SMEs	

Call references

Call Topic(s): HEALTH.2010.1.2-1. HEALTH.2010.1.2-2.; HEALTH.2010.2.1.1-2.; HEALTH.2010.2.1.1-2.;

EXPECTATIONS

Term commitment

- Short (< 1 year)
 Medium (1 to 3 years)
 Long (more than 3 years)

Expected results for your organisation:

Valuable cooperation, new approaches, scientific exchange, technology transfer

I agree with the publication of my contact data: YES NO