

Summary report in regard to research accreditation

I. General information

Name of organization	Institute of Cardiology
Organization type (<i>to underline</i>)	Research Institute High Education Institution <u>Ministerial Research Institute</u>
Research mission of organization	The health care of the people of the Republic of Moldova by offering a qualified medical assistance based on high performance medical technologies.
Strategic research direction (s)	Elucidation of the mechanisms of cardiovascular disorders and elaboration of prevention, diagnosis, treatment and rehabilitation methods, the implementation of new invasive treatment tools.
Evaluated period	2006-2010 years
Web of organization	www.cardiologie.asm.md

II. Research capacity (annual average for evaluated period)

Total number of employees	61					
Number of scientific researches	57					
Number of researches who possess honorific titles, scientific degrees, scientific and scientific-didactical titles	ASM full members	ASM correspondent Members	Professor	Associated professor	Doctor habilitat (DH)	Docotor (PhD)
	1	-	4	3	7	25
Number of researches involved in international projects	FP7		STCU		Bilateral	Others
	-		-		9	-
Number of young researches (under 35 years old)	Dr. (PhD)		PhD students		Others	
	6		8		-	
Financial resources (thousand MDL)	Public budget		International projects/grants		Research contracts	
	3245,3		-		865,8	
Distribution of expenditures (thousand MDL)	Salary		Infrastructure development		Other	
	2603,1		337,0		383,7	
Expenditures for infrastructure development (thousand MDL)	Equipments		IT infrastructure		Endowment of experimental conditions	
	337,0		00		00	

<p>List of 3 basic research methods, installations, technologies (per accredited field)</p>	<ol style="list-style-type: none"> 1. Method of blood assessment of the sarcoplasmic reticulum calcium pump protein SERCA2a, as a biomarker of acute myocardial infarction and reinfarction. 2. Method IVUS (intravascular ultrasonography) during coronary angioplasty as a tool of the atherogen plaque evaluation and coronary stenosis morphopathologic pattern underlying. 3. Method of the blood lipoprotein-associated phospholipase A₂ determination, as a marker of vascular endothelium dysfunction and inflammation. 4. Method for determining the effectiveness of measures to reduce the evolutive cardiovascular risk in patients with heart failure through assessment of the causes of disease exacerbation and the most important risk factors of death in patients with systolic dysfunction.
<p>List of provided scientific services</p>	<ul style="list-style-type: none"> • The ambulatory blood pressure monitoring with the assay of the blood pressure variability indices, the diurnal profile of blood pressure, the mean on the day, night and 24 hours time of blood pressure. • The quantitative method of determination the microalbuminuria in hypertensive patients. • Electrocardiographic 24-48 hours Holter monitoring in patients with heart failure to determine the variability of cardiac rhythm. • Angiographic contrast of the coronary and peripheral vessels. • The analysis of the intima-media thickness in patients with cardiac failure after myocardial infarction. • The evaluation of the large and small artery elasticity indices in patients with arterial hypertension.
<p>List of editorial activities</p>	<ul style="list-style-type: none"> • Institute of cardiology is the co-founder of the “The Bulletin of the Academy of Sciences. Medical Sciences” Journal. • The members of the editorial councils of scientific-practical journals: <ol style="list-style-type: none"> 1. Cardiology - Mihail Popovici, academician of ASM (Academy of Sciences of Moldova). 2. Cardiology of the post-soviet countries - Mihail Popovici, academician of ASM.

	<ol style="list-style-type: none"> 3. Ukrainian Journal of Cardiology - Mihail Popovici, academician of ASM. 4. Romanian Journal of Cardiology- Mihail Popovici, academician of ASM; Aurel Grosu, DH in medicine, university professor. 5. The Bulletin of the Academy of Sciences. Medical Sciences - Mihail Popovici, academician of ASM; Aurel Grosu, DH in medicine, university professor. 6. Medical Courier - Mihail Popovici, academician of ASM; Aurel Grosu, DH in medicine, university professor. 7. Public health, economy and management in medicine - Mihail Popovici, academician of ASM. 8. The Turkish Journal of Cardiology - Alexandru Caraus, DH in medicine, associate researcher; Oleg Calenici, DH in medicine, associate researcher. 9. The Turkish Journal of Invasive Cardiology- Alexandru Caraus, DH in medicine. Associate researcher; Oleg Calenici, DH in medicine. Associate researcher. 10. European Journal of General Medicine- Alexandru Caraus, DH in medicine, associate researcher; Oleg Calenici, DH in medicine, associate researcher. <ul style="list-style-type: none"> • The Monographs: <ol style="list-style-type: none"> 1. A.Grosu. Arterial fibrillation. Chisinau: The Universe, 2006, 176 p., ISBN978-9975-944-09-0 2. V.Ivanov; M.Popovici, U.Jalba. Balanced alimentation - a beneficial factor for health. Chisinau, 2007, 52 p. 3. A.Grosu. The Syncope. Diagnosis and treatment. Chisinau: The Universe, 2009. 304 p., ISBN 978-9975-47-022-3 4. M.Popovici; V.Cobet; N.Ciobanu; I.Popovici; L.Ciobanu; V. Ivanov. Cardiovascular reactivity in heart failure. Chisinau: Polidanus, 2010, 214 p. ISBN 978-9975-78-887-8.
--	---

III. Distribution of the research projects number and themes during evaluated period

Institutional projects	2006 5	2007 5	2008 5	2009 5	2010 5
Projects in the	2006	2007	2008	2009	2010

frame of State Programs	-	-	-	-	-
Technological transfer projects	2006 -	2007 1	2008 -	2009 -	2010 -
Projects for equipment procurement	2006 -	2007 -	2008 -	2009 -	2010 -
Projects for young researches	2006 -	2007 -	2008 -	2009 -	2010 1
Projects in the frame of bilateral programs	2006 -	2007 -	2008 -	2009 -	2010 1
International projects/grants	2006 -	2007 -	2008 -	2009 -	2010 -
List of 3 representative international projects/grants					
Research contracts	2006 3	2007 1	2008 2	2009 3	2010 2
List of 3 representative research contracts	<ol style="list-style-type: none"> 1. The study of bioequivalence of some drugs (Germany, Ukraine), 2007-2010 2. <i>EU Observational Research Programme. "Acute Coronary Syndromes Registry"</i> for 2008-2010. 3. <i>EU Observational Research Programme. Euro Heart Survey Heart Failure II</i> 				

IV. Scientific publications

Total number of international publications	Books -	Chapters in books -	Journal papers 12
Total number of publications in ISI journals and books	Books -	Chapters in books -	Journal papers 7
Total number of publications in the country	Books 4	Chapters in books 2	Journal papers 285
Total number of conference abstracts	International abroad 115	International in the country -	National 2
List of 5 representative publications (per accredited field)	<ol style="list-style-type: none"> 1. M. POPOVICI; V. COBET; N. CIOBANU; M. TODIRAS; V. IVANOV; I. POPOVICI; I. MORARU; L. CEBANU. "Different particularities of the vascular reactivity in heart failure". <i>The Cardiology</i>, 2010, 50 (7), 38-42 (<i>Russian language</i>). 2. V. IVANOVA; S. COSTIN; I. POPOVICI, N. CIOBANU; V. COBET; M. POPOVICI. "The quantitative and qualitative modifications of the circulating endothelial progenitor cells in patients with hypercholesterolemia. <i>The Cardiology</i>, 2010, 50(12), 45-52. (<i>Russian language</i>). 		

	<p>3. DALY, C.; VATAMAN, E. et al. The impact of guideline compliant medical therapy on clinical outcome in patients with stable angina: findings from the Euro Heart Survey on stable angina, <i>European Heart Journal</i>, 2006, 27,1298-1304.</p> <p>4. CARAUȘ, A.; CALENICI, O.; BATÂRALYEV, T.; POPESCU, L.; SAPOJNIC, N.; DURNEA, A. Effect of combination with beta-blocker and alpha-blocker <i>versus</i> diuretic in hypertensive patients with high concomitant risk. <i>The Turkish Journal of Cardiology</i>, 2007, 12(4), 14-17.</p> <p>5. GROSU, A.; RĂDUCAN, A. Enhancing the diagnostic value of tilt-table test through association with nitroglycerin. <i>Archives of the Balcanian Medical Union. The XXX-th Balcanian Medical Week, the First Congress of Emergency Medicine of the Republic of Moldova</i>. Chisinau, September 2008, vol. 1, no. 3-suppliment, p. 156-158.</p>
List of 5 citations	<p>- Popovici M, Kobets V, Ciobanu N et al. Inotropic cardiac response in the doxorubicin induced heart failure. <i>Cardiovasc Res.</i>, 2010, vol. 87 (Suppl 1): S43-S44. Cited by: Maruyama S, Shibata R, Ohashi K et al. Adiponectin ameliorates doxorubicin-induced cardiotoxicity through Akt protein-dependent mechanism. <i>J Biol Chem.</i>, 2011, vol. 286, p. 32790-32800.</p> <p>- Popovici M., Kobets V., Kostin S., Kapelko V. Protective effect of taurine on the myocardial effects of prolonged treatment with noradrenaline in rats. <i>În: Cardioscience</i>, 1992, vol. 1, nr. 3, p. 61-66. Cited by: Xu YJ, Arneja AS, Tappia PS et al. The potential health benefits of taurine in cardiovascular diseases. <i>Exp Clin Cardiol</i>, 2008, vol. 13, p. 57-65.</p> <p style="text-align: center;">A.A. Grosu, dr. hab, university professor is cited by:</p> <ol style="list-style-type: none"> 1. V.T. Mironenco. The differential diagnosis and treatment of syncope. <i>The International Neurological Journal</i> 1(11) 2007. (A.S. Smetnev, N.M. Sevcenco, A.A. Grosu. The syncope. <i>The Cardiology</i>. 1988. Number 2. C.107-110). (Russian language). 2. A.V. Foniachin, L.A. Gheraschina. The Syncope: the determination, classification, diagnosis and treatment. <i>Consilium Medicum</i>, volume 14/nr.2 2012. (A.S. Smetnev, N.M. Sevcenco, A.A. Grosu. The Syncope. <i>The Cardiology</i>. 1988; 2: 107-10). (Russian language). 3. A.V. Foneachin. The diagnosis and treatment in syncope. <i>Farmateka</i> N 10, 2008. (A.S. Smetnev, N.M. Sevcenco, A.A. Grosu. The Syncope. <i>The Cardiology</i>. 1988; 2: 107-10). (Russian language). 4. P.H. Djanashia, N.M. Sevcenco, S.M. Sorocoletov. The treatment of heart rhythm disorders. <i>The Cardiology</i> number 12/02 (A.S. Smetnev, A.A. Grosu, N.M. Sevcenco "The Diagnosis and treatment of the heart rhythm disorders". Chisinau: The Science, 1990). (Russian language). 5. A.I. Frolov, N.V. Peleh. The Syncope in the cardiac and neurological practice. <i>Practical Angiology</i>, 2008, 3(14), (A.S. Smetnev, N.M. Sevcenco, A.A. Grosu. The Syncope. <i>The Cardiology</i>. 1988, 2, p. 107-110). (Russian language).

V. Innovation output

Total number of patents	Registered in the country 7	Registered abroad -	Implemented 3
Total number of new developed methods and technologies	Registered -	Non-registered -	Implemented -
Total number of new scientific products	Registered -	Non-registered -	Implemented -
Total number of scientific outputs for central and local authorities (draft of law, strategies etc.)	2		
Total number of scientific outputs for educational institutions	Handbooks for high education -	Handbooks for pre-university institutions -	Delivered university courses -
List of 5 representative innovation outputs (per accredited field)	<ol style="list-style-type: none"> 1. The determination of C-reactive protein (high sensitivity) 2. The implementation of endovascular ultrasound method (IVUS). 3. The implementation of cardioverter-defibrillators in preventing ventricular tachyarrhythmias. 4. The interventional treatment through stenting in of coarctation of aorta 		

VI. Major scientific and innovative achievements

Short description of main scientific results and their confirmation (by awards, citations, development of international projects etc.)	<p>Laboratory “Interventional Cardiology”</p> <ul style="list-style-type: none"> • The disturbance of the balance between cell apoptosis ratio and circulating endothelial progenitor cells number is a predictor of endothelial dysfunction and coronary event prognosis. The circulating level of the endothelial progenitor cells is a marker of risk factor impact, and their proliferation index – a predictor of re-endothelization, angiogenesis and collateral system feasibility. <i>POSTER communication at the Congress of European Society of Cardiology, Vienna, 2005. Silver Medal at the International Salon from Bruxelles (EUREKA-2006): Innovations and new technologies in cardiovascular diagnosis.</i> • The pulmonary artery constrictor response augmentation on endothelin-1 action is due to smooth myocyte ETA receptor up expression and endothelial ETB receptor down expression, and is emphasized as a pathogenetical opportune mechanism of pulmonary arterial hypertension syndrome. <i>POSTER</i>
--	---

communication at the World Congress of Cardiology, Barcelona, 2006.

- The natural autochthon remedy, BioR, elaborated in base of *Spirulina Platensis* extract acts beneficially on atherosclerosis evolution, inducing vessel endothelial function improvement, LDL blood level reducing and HDL rise. *Bronze Medal at International Salon of Inventions, Geneva, 2006.*
- The endothelinic system activity modulation has a positive influence on heart failure evolution. In the early heart failure the ETA selective antagonist shares a superior therapeutic effect. On the other hand, nonselective ETA/ATB antagonist demonstrates a better effect in advanced heart failure. *POSTER communication at the Congress of European Society of Cardiology, (Acute Cardiac Care), Paris, 2008.*
- Left ventricular isovolumetric contraction impairment is an incipient mechanism of pump function and cardiac homeometric regulation disorders. The maximum myocardium isovolumetric contraction velocity is a significant predictor of heart functional reserves fainting. *POSTER communication at the Congress of European Society of Cardiology, (Frontiers in Cardiovascular Biology), Paris, 2010.*
- The big and small artery elasticity diminution represents a functional marker of the vascular remodeling as well as a predictor of both heart failure evolution and applied therapeutic strategies efficiency. *POSTER communication at the World Congress of Cardiology, Beijing, 2010.*

Department „Cardiac emergencies and rhythm disturbances”

- A correlation between admission hyperglycaemia $> 11, 0$ mmol/l and poor in hospital prognosis and high mortality was demonstrated in patients with acute myocardial infarction (AMI). In hospital mortality rate has a linear relation with the level of admission glycaemia and this relationship is stronger in nondiabetic subjects. *(National Congress of Cardiology, Romania, Sinaia, 2010)*
- One of three nondiabetic patients with AMI and admission

glycaemia above 5 mmol/l and one of two with glucose level over 11mmo/l showed a positive oral glucose tolerance test. Admission hyperglycaemia might be considered a marker of glucose metabolism abnormalities in patients with AMI and imposes specific assessment before discharge. It was established that 32,1% of AMI patients without diabetes have previously unknown abnormal glucose tolerance, 28,7% – impaired glucose tolerance and 3,4% - diabetes mellitus. (*National Congress of Cardiology, Romania, Sinaia, 2010*)

- Monitoring and correction of the glucose level in diabetic patients with AMI had a beneficial impact on in-hospital prognosis, led to the reduction of the in-hospital death rate and brought it closer to the similar indices of the nondiabetic subjects.
- The nitric oxide and catecholamine implication in the neural mediated vasodilatation mechanism of the neurocardiogen syncope was proven. (*European Society of Cardiology Congress (2010, Stockholm)*)
- It was certified that successive use of the static, dynamic and drug nitroglycerine or isoproterenol sensitized tilt tests augmented the diagnostic value of the orthostatic tilt test.
- The incidence of atrial fibrillation (AF) in acute ischemic stroke was attested, inclusive in relation with the type of the cerebral ischemia. Characteristics of the clinical course of AF in patients with stroke was assessed and the risk of death in this subjects was calculated; some clinical characteristics of the cerebral ischemia related to the presence of arrhythmia were put in evidence with the worst evolution of the stroke and higher mortality in patients with AF. (*The 6th World Stroke Congress and Xth International Symposium on Thrombolysis and Acute stroke Therapy, Vienna (2008)*).

Department “Chronic Heart Failure”

- A home based rehabilitation and secondary prevention program for patients with moderate and advanced ischemic chronic heart failure was elaborated, based on the following evidences: decline of death rate and multiple hospitalizations compared with the reference group, heart failure reduction, functional capacity increasing, and improvement of life prognosis of these patients.

(publications in European Heart Journal and at the 21st European Congress of Pathology)

- The informative value of the heart rate variability parameters in patients with chronic heart failure was determined. *(publications: Bulletin of the Academy of Science Republic of Moldova and in Medical Courier)*
- Have been assessed particularities of endothelial dysfunction in patients with old myocardial infarction and type 2 diabetes mellitus. *(Presentation report at the National Russian Congress of Cardiology and the cardiology Congress of post-soviet countries, 2007, October 2007).*
- Were highlighted positive effects of the red grapes extract treatment cure on vascular elasticity indices in patients with heart failure and as a support of post infarction rehabilitation. *(presented at the 78th European Atherosclerosis Society Congress, 2010, and Congress Euro-Prevent 2006, European Journal of Cardiovascular Prevention and Rehabilitation Journal)*

Laboratory "Arterial Hypertensions"

- The analysis of the scientific results accumulated has demonstrated that in patients with severe arterial hypertension it is present the heart failure syndrome with a mild functional classification (NYHA) $1,6 \pm 0,08$ despite the preserved systolic function (EF $60,5 \pm 0,7\%$). The diastolic function of the left ventricle has been obviously improved at all the control phases, and the maximum outcome has been recorded at the final process. The best results were obtained at the administration of nonselective beta-adrenergic blocker Timolol. At the final stage of surveillance the most important indicators of diastolic function like the level of E/A has been increased with 98,5% at the administration of Timolol *versus* 91,3% at the Amlodipine administration, the isovolumetric relaxation time decreased with 29,3% *versus* 26,4% and the deceleration time with 19,1% *versus* 14,4%, respectively. It has been recorded a high level of correlation between some parameters of blood pressure variability and the impairment of most important target organ - heart, manifested by diastolic dysfunction.

	<ul style="list-style-type: none"> The use of medicine like Eprosartan <i>versus</i> Ramipril in the treatment scheme of arterial hypertension has shown the beneficial influence mostly of the Eprosartan on the echocardiographic indices of diastolic function, diurnal levels of blood pressure, vascular elasticity parameters, as well as reduction of microalbuminuria which has highlighted the importance of a better use of these drugs in order to remove the worse consequences: global heart failure, brain stroke, advanced renal failure. <p>Laboratory “Pediatric cardiology”</p> <ul style="list-style-type: none"> A study of acute myocarditis in children has been realized whose outcomes permitted an elaboration of early diagnosis criteria and evaluation of the therapeutic effects of angiotensin-converting-enzyme inhibitors: captopril, enalapril and the aldosterone antagonist - spironolactone at the initial stage of the pathology and in the long term treatment at 3-6-12 months, showing the efficacy of these drugs. The estimation of the risk factors in arterial hypertension in the overweight and obese children underlined the presence of more than 2 risk factors in association with hereditary collateral history aggravated by cardiovascular diseases in the first and second generations, which forces their attribution in a category of major risk factor responsible for arterial hypertension evolution. Testing of the leptin - plasma marker and appreciation of the insulin-resistance by assay of the serum insulin and insulin-resistance HOMA-IR index had proven their importance in the early diagnosis of metabolic and hormonal disorders, which will lead to prophylaxis and treatment at the initial preclinical stages. 				
Number of organization’ invited speakers at international conferences	2006 8	2007 9	2008 9	2009 10	2010 10
Short description of technological transfer and innovation results and their certification by implementation	<ul style="list-style-type: none"> IVANOV. V.; POPOVICI, M.; COSTIN, S.; POPOVICI, I.; CPBET. V.; CIOBANU, L. The Invention patent number 2930. Method of the endothelium dysfunction evaluation of the coronary vessels and their capacity of regeneration. BOPi number 12/2005. M.POPOVICI. Officer of the order ”Inventive Merit” of the 				

	<p>Belgium Kingdom, 2006.</p> <ul style="list-style-type: none"> • POPOVICI, M.; IVANOV, V.; COSTIN, S; POPOVICI, I; COBET, V.; CIOBANU, L. Evaluating tool of atherosclerotic endothelial coronary injuries. Eureka, 2006. Silver Medal. • POPOVICI, M.; IVANOV, V.; COBET, V.; POPOVICI, I.; RUDIC, V. Natural Remedies in the Treatment of Dislipidemia (Gold Medal). 54th International Saloon of Inventions, Researches and New Technologies, Bruxelles, ” Eureka” , 2006, p. 60. • POPOVICI, M.; IVANOV, V.; COBET, V.; POPOVICI, L.; RUDI, V. The natural treatment of dyslipidemia. Bronze Medal at the International Saloon of Inventions, Geneva, 2007. • POPOVICI, M.; POPOVICI, I.; IVANOV, V.; SÎRBU, S.; CIOBANU, L.; COBET, V. The blood SR/Ca-ATP-ase determination - a new method of acute myocardial infarction diagnosis. Silver Medal. The 6th International Exhibition of Invention, China (Suzhou), 2008, October 15-20. • POPESCU, L.; CARAUȘ, A.; JUCOVSCI, C. The invention patent: The prognostication method in the paternal evolution of the left ventricle remodeling in the diastolic dysfunction due to hypertensive etiology. Number 3830, 2009. • IVANOV, V. The blood SR-Ca-ATP-ase determination – a new method of acute myocardial infarction diagnosis. State Intellectual Property Agency of the Republic of Moldova. Silver Medal, 2007 • A.GROSU. Diploma of Honor of the Ministry of Culture of Moldova for the volume ”Syncope. Diagnosis and Treatment”, holder of the award ”Book of the Year in Medicine”. Prize at the International Saloon of Book-2010, Iași. 				
Number of defended doctor habilitat scientific degrees per year	2006 1	2007 -	2008 -	2009 -	2010 -

VII. Present/further involvement in the Seventh Framework Programme (FP7): specific programs (Cooperation, Ideas, People, Capacities) of interest and its sub-divisions.

1. HEALTH.2011.2.1.1.-4: Population genetic studies on cardio-metabolic disorders in EU/AC and EECA population. FP7-HEALTH-2011-single stage.
2. The International Registry of Acute Coronary Syndromes registry study in Transitional Countries (ISACS-CT)

VIII. Accredited research field and its evaluation by the National Council for Accreditation and Attestation of the Republic of Moldova (very good/good/satisfactory)

The Institute of Cardiology is accredited by the National Council of Accreditation and Attestation of Republic of Moldova with the qualification:

Cardiology (the assessment of the performance - good).

IX. Category (A/B/C) attributed to organization by the National Council for Accreditation and Attestation of the Republic of Moldova

Organization with international recognition (A category).

X. Institutional development actions planned for the next 5 years (maximum ½ page).

- The further scientific activity having as priority directions the studies based on:

- Evaluation of the thrombembolic risk in non-valvular arterial fibrillation and optimization of the anticoagulant control.
- The study of predictors of the coronary stenosis and possibilities of in-stent restenosis risk diminution.
- The impact of different Ang II receptor antagonists on the hypertension induced diastolic dysfunction in long term treatment.
- Rehabilitation of the patients after coronary revascularization.
- The multidirectional estimation of the risk factors in the hypertensive overweight children and teenagers.

-The implementation and promoting of the scientific researches results in medical area as well as of the advanced technologies (technological transfer)

-The active implication of young researchers in the research, development and innovation activity inclusive by the implication in the international projects, abroad internships, postgraduate studies of abroad.

-The efficiency in the research activity to achieve the scientific distinction and titles.

-The fortification of material-technical base of the scientific laboratories by purchase of the high-performance techniques and equipment.

-The active participation at the international projects competitions, the increasing of the project proposal number at PC7.

-Improvement of the institution vision in international area by achieving of the invention patents, increasing of publications abroad number, and by publication of the articles in the journals with ISI impact and electronic publications.