

# CNUH Translational Research Center on Aging

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## Major research goals

Korea is rapidly moving toward an aging society. To meet the changing needs of our society, advances in medical technology should be made available to support older persons and treat chronic diseases in elderly. The advanced aging research center is devoted to research in aging and health technology. The goal is to build a well aging society by supporting the elderly to live longer and healthier lives.

## Major research topics

There are 4 research areas; 1) vascular regeneration technology using stem/progenitor cells, 2) technology for the early detection of vascular aging, 3) regenerative technology for degenerative bone disease, and 4) health monitoring for aging.

## Major achievements

1. Identification of endothelial progenitor cells in corpus cavernosum and their modulation by testosterone
2. Predictors of reversible severe functional tricuspid

3. regurgitation in patients with atrial fibrillation.
3. Establishment of nationwide registries the field of various rheumatologic diseases including osteoarthritis, rheumatoid arthritis, systemic lupus erythematosus, and fibromyalgia.
4. Establishment and management of two large population-based cohort studies to understand the aging process and identify risk factors for aging-related chronic diseases.

## Representative figures of major achievement

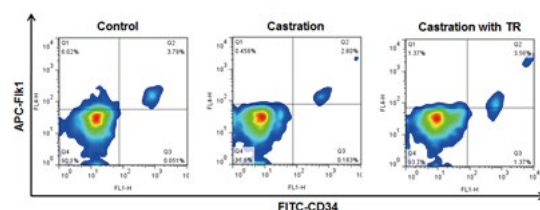


Figure 1. Flow cytometric analysis of EPC-specific marker expression in the rat corpus cavernosum.

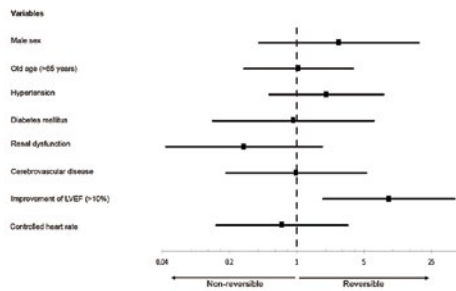


Fig. 2. Independent predictors for reversibility in patients with severe tricuspid regurgitation and atrial fibrillation (Forest plot) LVEF, left ventricular ejection fraction.

Figure 2. Independent predictors for reversibility in patients with severe tricuspid regurgitation and atrial fibrillation(forest plot).

Table 1. New candidate genes related with fibromyalgia from the Korean Nationwide Fibromyalgia registry

Affected system(s)	Genes	Effect in FM
Catecholaminergic pathways	<i>Rs4818</i> and <i>rs4633</i> of <i>COMT</i> gene	Development of FM
	<i>ACG</i> haplotype of <i>COMT</i> gene	Development of FM and severe pain sensitivity(measured by tender point numbers)
Ion channels	Haplotype of <i>TRPV2</i> gene	Protective role against FM
NO metabolisms	SNP and haplotype of <i>TRPV3</i> gene	Fatigue symptom in FM patients
	<i>CCTA</i> haplotype of <i>GCH1</i> gene	Protective role against FM and lower pain sensitivity in FM patients
Neuroplastic pathways	<i>CREB1</i> gene	Development of FM and severe pain sensitivity
	SNPs and haplotypes of <i>BDNF</i> gene	Development of FM and some psychological symptoms in FM patients

Table 2. Clinical measurements in the Namwon Study(2004-2012) and the Dong-gu Study(2007-2010)

Table 3 Clinical measurements in the Namwon Study (2004-2012) and the Dong-gu Study (2007-2010)

Category	Measurements
<b>Baseline survey (both cohorts)</b>	
Anthropometrics	Height, body weight, waist circumference, hip circumference, body compositions by bioelectric impedance method, grip strengths (both cohorts); skinfold thickness (Namwon cohort)
Clinical test	Blood pressure, ECG, ankle-brachial index, brachial artery pulse-wave velocity, carotid artery intima-media thickness, carotid plaque, BMD of both femur and lumbar spine by DXA (both cohorts), BMD of calcaneus and distal forearm by DXA, quantitative ultrasound of calcaneus (Namwon cohort), retinogram, knee joint X-ray, echocardiogram, carotid artery diameter, periodontal examination, panoramic radiograph (Dong-gu cohort), chest X-ray (Namwon cohort)
Laboratory test	Fasting serum glucose, insulin, haemoglobin A <sub>1c</sub> , lipid profiles (total cholesterol, high-density lipoprotein cholesterol, triglyceride), thyroid function markers (thyroid-stimulating hormone and free T <sub>4</sub> ), liver enzymes (aspartate aminotransferase, alanine aminotransferase, gamma glutamyltransferase), renal function markers (blood urea nitrogen, creatinine, uric acid), bilirubin, high-sensitive C-reactive protein, CBC, fasting urine albumin, creatinine (both cohorts), serum folate, sex hormones (estradiol, testosterone, sex hormone-binding globulin) (Namwon cohort), fasting plasma homocysteine (Namwon cohort, partially in Dong-gu cohort)
Genotyping	Genetic polymorphism, methylenetetrahydrofolate reductase C67T, apolipoprotein E (both cohorts), angiotensin converting enzyme gene insertion/deletion (Namwon cohort)
<b>Follow-up survey (Namwon cohort)</b>	
Anthropometrics	Height, body weight, waist circumference, hip circumference, body compositions, grip strengths
Clinical test	Blood pressure, ECG, ankle-brachial index, brachial artery pulse-wave velocity, carotid artery intima-media thickness, carotid plaques, BMD of femur, lumbar spine, calcaneus and distal forearm by DXA, retinogram
Laboratory test	Fasting serum glucose, haemoglobin A <sub>1c</sub> , lipid profiles, liver enzymes, renal function markers, bilirubin, CBC, fasting urine albumin, creatinine

ECG, electrocardiogram; BMD, bone mineral density; DXA, dual-energy X-ray absorptiometry; CBC, complete blood count.

## Major relevant publication

- Hwang I, Lee HS, Yu HS, Kim ME, Lee JS, Park K. Testosterone modulates endothelial progenitor cells in rat corpus cavernosum. *BJU Int.* 2016;117:976-81
- Park DJ, Kim SH, Nah SS, Lee JH, Kim SK, Lee YA,
- Hong SJ, Kim HS, Lee HS,
- Cho JY, Kim KH, Kim JY, Sim DS, Yoon HJ, Yoon NS, Hong YJ, Park HW, Kim JH, Ahn Y3, Jeong MH, Cho JG, Park JC. Predictors of reversible severe functional tricuspid regurgitation in patients with atrial fibrillation. *J Cardiol* 2016;68:419-425.
- Kim HA, Joung CI, Kim SH, Lee SS. Polymorphisms of the TRPV2 and TRPV3 genes associated with fibromyalgia in a Korean population. *Rheumatology(Oxford)* 2016;55(8):1518-27.
- Kweon SS, Shin MH, Jeong SK, Nam HS, Lee YH, Park KS, Ryu SY, Choi SW, Kim BH, Rhee JA, Zheng W, Choi JS. Cohort Profile: The Namwon Study and the Dong-gu Study. *Int J Epidemiol.* 2014;43(2):558-67.

## Research networks

Our center support evidence-based health promotions and disease prevention programs through collaboration with Gwangju Senior Technology Complex, Gwangju International Aging Symposium and Gwangju Senior Health Town.

