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New Scientific Achievements of Iranians

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Iranian Duo

Wins French Design Award

At a glamorous awards ceremony held recently at the Espace Clacquesin in Paris, the world's top designers and automotive journalists gathered together to reveal the 2012 Interior Motives Student Design of the Year: 'Autopool' by Siavash Jafari Jozani and Mina Kasirifar from the University of Tehran.

At the end of what was a memorable evening, the two Iranian students walked away with one of the most prestigious accolades in the automotive design industry and a cash prize of $5,500, InteriorMotivesAwards reported.

After securing a convincing victory in the hotly-contested Best Conceptual Interior category, Jozani and Kasirifar's imaginative 'Autopool' project went on win the award by almost unanimous vote, garnering praise from the panel of judges for its human-centric proposal for a public transportation system of the future.

Chief Designer of Ford's Strategic Concept Group David Woodhouse said of the design, "It's conceptual but it has function. This is very beautiful--very much a thinker's project."

Ken Lee, design manager at Nissan Design Europe, added, "The forms are great--very human."

Centered on the city of Budapest, Autopool offers a safer, more modern alternative to hitchhiking--an activity still prevalent in Hungary.

The user simply takes a seat at one of the stations located throughout the city, dials their destination into the built-in panel and waits to be collected by a suitable vehicle with a shared route.

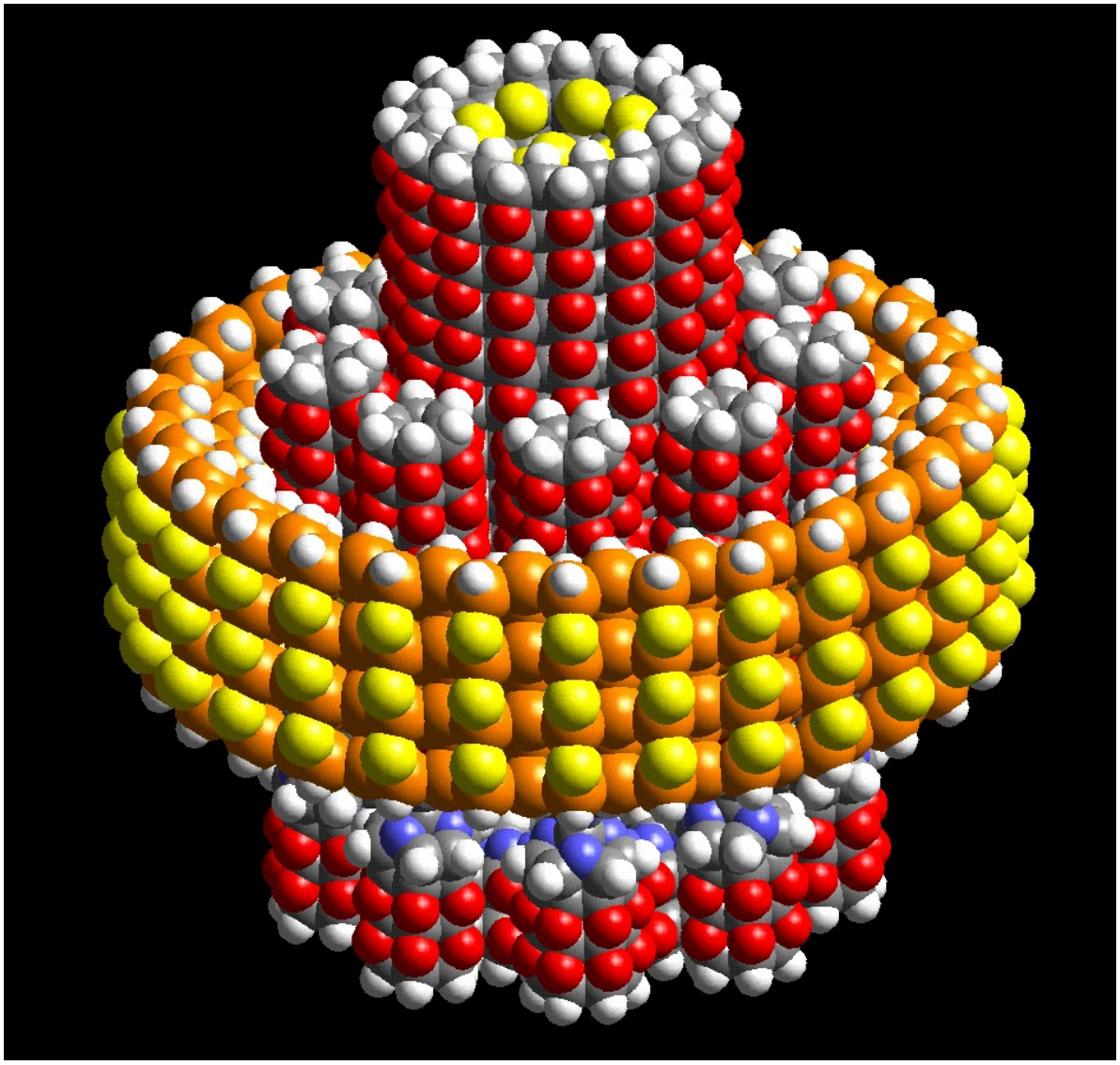
During boarding, the seat swivels out on an arm from the station

and locks in place inside the vehicle according to the layout chosen by the driver. The chairs can be arranged in a facing position for meetings, against the windows when catering for tourists who want to sightsee, or arranged in rows to maximize capacity in mass transit mode.

Launched earlier this year and themed “What Comes Next? Make Your Mark on the Car of Tomorrow”, this year’s contest attracted entries from an incredibly diverse range of schools and nations, including Iran, India, South Korea and Sweden.

The ceremony--presented by acclaimed vehicle designer and former BMW design director, Chris Bangle--was the culmination of a six-month quest to find the most talented student designers studying anywhere in the world.

The event was judged by some of the biggest names in vehicle design, including Volkswagen’s Romulus Rost and Wolfgang Müller-Pietralla, Andreas Stump of Citroën, Peugeot’s Gilles Vidal, Anne Asensio of Dassault Systèmes, Nissan Design Europe’s Bert Dehaes and Ken Lee, David Woodhouse of Ford’s Strategic Concepts Group Design Studio, McLaren’s Frank Stephenson, Bentley’s head of interiors, Robin Page, Jurgen Uedelhoven of Uedelhoven Studios and BASF’s Eva Hofli.



Iran Among 10 Nanotech Pioneering States

Iran ranks among the 10 leading countries of the world in nanotechnology, an Iranian researcher said, adding that the country also ranks first in the Middle-East in the field.

“Iran is among the 10 superior world countries in nanotechnology and ranks first in the Middle East in the field,” nanotechnology scientist, Zeinab Fereshteh, told Fars News Agency.

She also said Iran ranks 25th in the world for utilizing nanotechnology in different industries and commercializing products.

The nanotechnology growth indicators for Iran marked a high rise in the total number of scientific publications in recent years, as the country jumped two ranks (at the beginning of 2012) to stand 10th in the world. Iran ranked 14th in the same list at the beginning of 2011.

Dr. Ali Mohammad Soltani, the head of Policymaking Workgroup of Iran Nanotechnology Initiative Council (INIC), announced in August that over 3 percent of the world publications on nanotechnology belong to Iranian researchers and scientists.

“More than 3 percent of all published scientific journal articles associated with nanotechnology belong to Iran and that is while the country constitutes only 1 percent of the world’s population,” Soltani said.

“This formulated plan indicates the long-term and panoramic perspective of the Iran’s nanotechnology authorities and according to Iran’s Holistic Scientific Map on Sciences, the country is supposed to possess a 2-percent world share in the production of nanotech-based products,” Dr. Soltani said, referring to the ten-year strategic plan of INIC for nanotechnology.

Soltani noted that Iran has 4,000 nanotechnology specialists, and said, “At present, we are training 1,159 and 3,989 students at PhD and MSc levels, respectively, in different fields of nanotechnology in Iran.”

Iran's Arash Habibi Awarded at Malaysia Computer Contest

Iranian computer specialist Arash Habibi Lashkari has been awarded at the 2012 national contest of MSC Malaysia Asia Pacific ICT Awards (MSC Malaysia APICTA).

Lashkari's new design of disposable password (single use password) can provide the computer system to be protected from six popular password attacks.

The best innovations and inventions of the contest have been identified by a jury panel comprising Microsoft engineers and several experts from Malaysia's Cyber Security Organization.

Lashkari has also won at the 14th Innovation and Technology Exhibition (INATEX 2012) that was recently held from October 3 to 4 in Malaysia.

He received a Bronze Award for the invention/innovation of 'A robust graphical password for mobile applications'.

Born in 1974, lashkari is PHD candidate of Computer Science and Information Security in Technology University of Malaysia.

The MSC Malaysia APICTA aims at recognizing creativity, innovation, and excellence of individuals, students, entrepreneurs, small and medium enterprises (SMEs) and organizations in Malaysian ICT.

Winners of the MSC Malaysia APICTA Awards will represent Malaysia at the annual International APICTA Awards.

Saffron Extract Offers Cardio Protection

Researchers at Mashhad Medical University found saffron and safranal, an organic compound isolated from saffron, have cardio protective effect.

Hussein Husseinzadeh, who led the research, said the study was designed to evaluate the cardio protective effect of Crocus sativus L. (saffron) aqueous extract and safranal, the major constituent of the essential oil of saffron, on lipid peroxidation, biochemical parameters and histopathological findings in isoproterenol (ISO)-induced myocardial infarction in Wistar rats.

“The saffron extract (20, 40, 80 and 160 mg/kg/day IP) or control were administered for 9 days along with ISO (85 mg/kg, SC, at 24

hr interval) on 8th and 9th day in rats," he said, adding that activities of creatine kinase-muscle, brain (CK-MB) and lactate dehydrogenase (LDH) were measured using standard commercial kits.

Husseinzadeh noted that the level of malondialdehyde in heart tissue was estimated through the thiobarbituric acid reactive species test.

"For histopathological examination, hematoxylin and eosin staining was used," he said.

The researcher further said ISO administration induced a statistically significant increase ($P< 0.001$) in serum LDH and CK-MB and a significant increase ($P< 0.001$) in the levels of thiobarbituric acid reactive substances (TBARs) in the heart as compared to vehicle control rats.

He also said saffron pretreatment (20, 40, 80 and 160 mg/kg IP) or safranal pretreatment (0.025, 0.050, 0.075 ml/kg IP) for 8 days significantly decreased ($P< 0.001$) the serum LDH and CK-MB and myocardial lipid peroxidation as compared to ISO- induced rats.

Husseinzadeh concluded that histological findings of the heart sections confirmed myocardial injury with ISO administration and preserved nearly normal tissue architecture with saffron or safranal pretreatment.

Saffron and safranal may have cardio protective effect in ISO-induced myocardial infarction through modulation of oxidative stress in such a way that they maintain the redox status of the cell.

Cell Therapy for Stress Urinary Incontinence

Researchers at Mashhad Medical University have created a novel stem cell therapy for stress urinary incontinence.

The team of researchers comprised Maliheh Keshvari Shirvan, Daryoush Hamidi Alamdari, Mohammad Reza Darabi Mahboub, Alireza Qannadi and Hamid Reza Rahimi.

Shirvan said the aim of this study was the safety assessment of urethra injections of autologous total nucleated cells (TNCs) along with platelets, which focused on the outcome over a six-month period.

She said an open, prospective study was conducted on 9 patients with severe stress urinary incontinence (SUI).

“At the baseline, 1, 3 and 6 months after external urethral sphincteric and submucosal injections of autologous TNCs along

with platelets, the patients were assessed according to cough tests, Q-Tip tests, urodynamics, 1 hour pad tests, upper tract ultrasonography (UTU), post voiding residue (PVR), International Consultation on Incontinence Questionnaire-Urinary incontinence (ICIQ-UI), and International Consultation on Incontinence Modular Questionnaire-Quality of Life (ICIQ-QOL)," she said.

Shirvan further said that in the 3rd month of post-injection, the maximum urethral closure pressure (MUCP) and abdominal leak point pressure (ALPP) were measured in one patient with intrinsic sphincteric deficiency (ISD; the baseline: ALPP < 60 and MUCP < 30 cmH2O).

"No complications were observed after injection. At 6-months' follow-up (F/U), all the patients considered themselves clinically cured with eight women completely continent and one marked improvement," she said.

The researcher said cell therapy consisting of intrasphincteric and submucosal injections of autologous TNCs along with platelets in SUI patients is a feasible and safe procedure.

Shirvan said the results point out those subjects cured or with marked improvement after six months F/U.

Urinary incontinence is any involuntary leakage of urine. It can be a common and distressing problem, which may have a profound impact on quality of life. Urinary incontinence almost always results from an underlying treatable medical condition but is under-reported to medical practitioners.

The most common causes of urinary incontinence in women are stress urinary incontinence and urge urinary incontinence. Women with both problems have mixed urinary incontinence.

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ranian Develops Anti-Cancer System

An Iranian researcher at Amir-Kabir Polytechnic University has developed a new drug-carrier system for fighting cancer cells by using herbal anticancer properties, especially those in green tea.

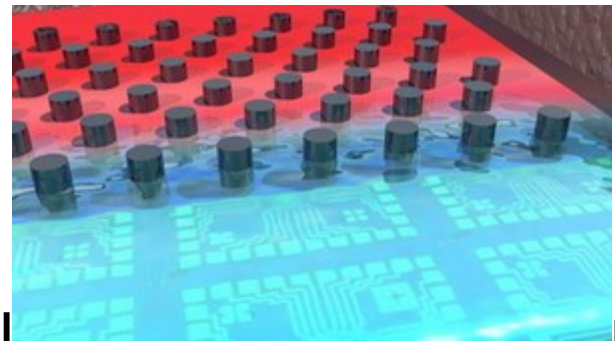
“Green tea includes catechin, an anticancer material sensitive to cancer cells, but it vanishes in the body’s chemical environment quickly when used in normal doses,” Sarah Shafiei, the researcher of the project, was quoted as saying by Fars News Agency.

Shafiei said the medication penetrates cancerous cells and then releases the needed amount of catechin in them without poisoning or damaging the healthy cells.

“The system has passed cellular tests and destroyed prostate cancer cells successfully,” Shafiei said, adding that the system should now undergo clinical tests.

Shafiei pointed out that natural anticancer materials, including green tea, are more compatible with the body and cause less side-effects compared with chemotherapy.

The researcher noted that her newly-developed system is cheaper, easier to make compared to its foreign rivals and uses common polymeric materials.



Iranians Boost Sensitivity of Nanosensors

Researchers of Tehran University have succeeded in increasing the sensitivity of tin dioxide nanosensor by synthesizing a multi-walled carbon nanotube and tin dioxide nanocomposite.

In this research, multi-walled carbon nanotubes were used to improve the properties of semiconductor sensors of volatile organic compounds, Fars News Agency reported.

“In this research, nanocomposites consisted of functionalized carbon nanotubes and tin dioxide nanoparticles were synthesized through sonochemical and chemical vapor deposition (CVD) methods,” Sadeq Ahmadnia Feyzabad, one of the researchers of the plan, explained.

The production of nanoparticles with diameter less than 6 nm is one of the advantages of the chemical deposition method used in this research. It causes the nanosensor made of such nanoparticles to have a very high sensitivity.

Recent studies show that the reduction in the diameter of SnO2 nanoparticles to less than 6 nm significantly increases the sensitivity of the sensor made of these particles.

“One of the most important applications of these nanosensors is in medical fields. Normal or common or uncommon physiological processes in human’s body can emit gases in expiration. Therefore, the combination of expiration changes. Internal illnesses are usually diagnosed by carrying out various tests such as blood test or through biopsy from the desired tissue,” Feyzabad said.

“However, respiration analysis can help the diagnosis of the illness more quickly and when the number of the damaged cells is little. Lung cancer, breast cancer and diabetes are among illnesses that can be diagnosed through respiration analysis.”

Iranians Remove 90% of Arsenic From Polluted Waters

Iranian researchers from Bu-Ali Sina University, Yazd University and Hamedan Medical University have succeeded in removing arsenic from polluted waters by using calcium peroxide nanoparticles.

According to the results, these nanoparticles can remove 90 percent of arsenic from polluted waters due to their high oxidation power and harmlessness, Fars News Agency reported.

“The goal of the research was to present a useful, simple and cost-effective method in order to reduce arsenic concentration in polluted waters through the synthesis of calcium peroxide nanoparticles. In this research, a method was presented, which according to the final results, is one of the newest methods in the world,” Dr. Hussein Banejad, one of the researchers of the plan, explained.

According to Dr. Banejad, the removal of arsenic from waters polluted with this element by using calcium peroxide nanoparticles was the most important characteristic of the research.

Calcium peroxide nanoparticles oxidized arsenic from a very toxic form (five capacities arsenic) to three capacities arsenic with much lower toxicity due to their high oxidation power.

Arsenic is finally separated from the environment due to the formation of a complex and due to the low activity of arsenic and its high adsorption on various surfaces. A final 90 percent removal of the pollutant is obtained at the end of the experiment.

The method is classified among the high performance methods in the removal of hazardous materials from water resources and industrial wastewater. The most noticeable feature of the method is the ability of arsenic removal, as a toxic and hazardous material, from surface and underground waters without the need for specific chemical components.

Iranian Researcher Analyzes Brain Chemical

A Wayne State University researcher's take on the current state of brain chemical analysis is the cover story in a recent professional journal, accompanied by a podcast.

In "Ultrafast Detection and Quantification of Brain Signaling Molecules With Carbon Fiber Microelectrodes," published in the Analytical Chemistry, Parastoo Hashemi, PhD, assistant professor of chemistry in the College of Liberal Arts and Sciences, examines the use of carbon fiber microelectrodes (CFM) in neurochemical measurements, Science Codex reported.

"The field is more critical than ever," she said, "with the increasing number of diagnoses of Alzheimer's and Parkinson's diseases, which remain largely untreatable, and with a surge in reports of mood disorders and substance abuse."

The brain comprises many different types of cells with different roles and all of those cells communicate through synapses where chemicals interact.

"For us to really understand the brain, we have to understand its chemistry, and to understand the chemistry, we have to understand how these chemicals move around in the synapse,"

Hashemi said. “We need to know what different molecules are there so we can assign specific roles to specific molecules.”

CFMs have proven a good tool for analyzing brain chemicals, which Hashemi said requires adhering to four criteria: size, speed, selectivity and sensitivity--which her group refers to as the four S’s.

Selectivity is needed to distinguish between types of chemicals; sensitivity because chemicals often are present in low levels. Speed is important because chemicals fluctuate dynamically--as in processing of conversation, for example--and small size is necessary to fit in gaps between areas of tissue the electrode is intended to sample.

CFMs now can be made very small--1/100 the thickness of a human hair--and are uniquely biocompatible. “Because other molecules don’t stick to CFMs,” Hashemi said, “the fibers induce little inflammation or rejection response from tissue.”

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heir small size enables CFMs to be combined in microarrays to measure reactions in multiple synapses simultaneously, giving

researchers greater insight into how various parts of the brain work together. Amperometry is one technique for using CFMs and works well in a highly controlled system, she said.

“If you have a bunch of cells and you know what’s in them already, you can put electrodes right next to a cell and essentially hold it at constant voltage value and oxidize everything that comes out,” Hashemi said. “If you know what’s in there, you can get really fast, really sensitive responses.”

“Amperometry enables researchers to expose cells to materials in consumer goods, such as bisphenol A, commonly known as BPA, to see how cell function is impaired,” she said. “It’s a very effective, neat preparation.”

Iranian Researcher Creates 24-Carat Gold in Lab

Iranian researcher Kazem Kashefi along with his American colleague has created gold in Michigan State University using bacteria in a way called ‘microbial alchemy.’

Kashefi and Adam Brown used a special type of bacterium to turn

liquid gold into more valuable 24-karat gold.

They reported that the bacteria Cupriavidus metallidurans is capable of resisting the toxic effects of gold chloride, and can transform large concentrations of the substance into 24-karat gold, Science Daily reports.

“Microbial alchemy is what we are doing, transforming gold from something that has no value into a solid, precious metal that is valuable," said the assistant professor of microbiology and molecular genetics Kazem Kashefi.

Researchers proved the point with their art installation ‘The Great Work for the Metal Lover,’ in which colonies of the hardy bacteria were fed with massive doses of gold chloride. In about a week, the bacteria produced a gold nugget.

Their artwork contains a portable laboratory made of 24-karat gold-plated hardware, a glass bioreactor and the bacteria, a combination that produces gold in front of the audience.

"This is neo-alchemy. Every part, every detail of the project is a cross between modern microbiology and alchemy," said the associate professor of electronic art and intermedia, Adam Brown.

“Science tries to explain the phenomenological world. As an artist, I'm trying to create a phenomenon. Art has the ability to push scientific inquiry," he added

Chewing Gum to Cure Nausea

Researchers from the Islamic Azad University combined bitter dimenhydrinate with taste buffers in a palatable chewing gum that reduces nausea symptoms.

There's nothing worse than taking medication only to find that the pill coating is disgusting, ISNA reported.

Chalky, bitter, a bit like taking a dose of paint thinner. Add symptoms of nausea and chances are, you're not going to be feeling better any time soon.

Researchers from the Islamic Azad University presented their findings this week on a chewing gum with the active ingredient dimenhydrinate that not only calms symptoms of motion sickness, including nausea, but that tastes good while it works. A delicious fix.

Dimenhydrinate is an antihistamine with anti-cholinergic qualities used to both prevent and treat symptoms of motion sickness, such as vomiting, vertigo, dizziness and nausea. It is available in some forms over the counter.

Before this study, however, dimenhydrinate treatments often were not palatable and were considered ‘bitter’. The goal of the research was to produce a product that was tasty enough to be an effective treatment for nausea.

The bitter quality of dimenhydrinate was not the only objection to the treatment, said study author Mohsen Sadat Rezaei in an email to Healthline.

"In addition to bitterness,” says Rezaei, “dimenhydrinate exhibited some numbing effects in the mouth upon chewing, which was not very pleasant.”

In the final product, says Rezaei, researchers were able to reduce the numbness to a tolerable level.

To reduce the unfavorable taste of dimenhydrinate, researchers combined the active ingredient in granular form with different ratios of Eudragit EPO and some proportions of methyl salicylate, which is commonly known as wintergreen oil.

Participants in the study reported a decrease in nausea and nausea-like symptoms, says Rezaei, however, “there should be further study to statistically demonstrate the effectiveness of the gum and allow us to make a comparison with the existing dimenhydrinate dosage forms as far as onset of action, and if the gum indeed results in quicker relief of nausea.”

The direct compression chewing gum Rezaei’s team developed is an exceptional delivery method because of its ease of use. And because of the focus on palatability, this gum actually tastes good. Not only are direct compression tablets ideal for dispensing dimenhydrinate, they’re also easier to produce than traditional chewing gum. Ideally, says Rezaei, they’ll be able “to make clinical

batches and do further studies in order to commercialize this product".

Rezaei has tried the dimenhydrinate direct compression tablets and reports "a simple and tasty mint-flavored chewing gum". All direct compression tablets with different proportions of granular dimenhydrinate, methyl salicylate and Eudragit EPO were tested on three different study participants of ages 23 to 29 years. After the initial test, selected tablets were tested on 10 participants of ages 23 to 29.

During each test, bitterness, ease of chewing and aftertaste were compared. Remedies for motion sickness are common; everyone has gotten advice like, "look out the window", or even, "chew gum" during a car ride with one too many turns. But effective treatments are a bit harder to come by.

In 2007, researchers compared ginger, an old school remedy for motion sickness, with the more clinical dimenhydrinate in treating nausea and vomiting during pregnancy and found that they were equally effective.

Iran Among Top Five In Orthopedics

Iran is among the top five countries in the fields of orthopedics and arthroscopic surgery.

Dr. Gholamali Akasheh, the head of the Iranian Orthopedic Surgeons Association, made the announcement in a press conference on the eve of the 20th annual congress of the association.

Akasheh pointed out that Iran is ahead of many European and Western countries in the field.

The official noted that over 100,000 people are injured in road accidents annually, which raises the need for orthopedic services.

He also said billions of rials are spent annually for the purchase of medicines that have no effect on the treatment of orthopedic and joints problems, stressing that there is no scientific proof that height-enhancement pills actually work.

Addressing the same press conference, Seyyed Naqi Nourbakhsh, a member of Iran's Supreme Medical Council, highlighted the country's potentials for developing health tourism, especially in the field of orthopedics services.

"(Development of) health tourism has been mentioned in the Fifth National Development Plan (2010-14), but unfortunately there is a lack of executive resolve to accomplish it," he said.

He said health tourism is an inter-organizational issue that needs the cooperation of different bodies like the Foreign Ministry, Health Ministry and Islamic Republic of Iran Medical Council.

Nourbakhsh further said that the field of orthopedics receives the third highest rate of medical complaints from the public.

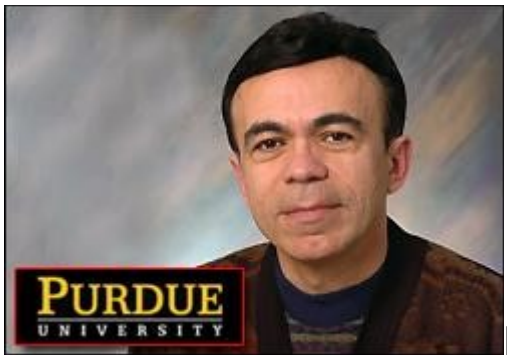
"However, orthopedists have the least number of convictions for

failing to fulfill their medical responsibilities because an expert review found the complaints untenable," he said.

Nourbakhsh said it is illegal for surgeons to operate on healthy individuals for height-enhancement, because such surgeries involve unwanted complications.

Mohammad Razi, secretary of the 20th Congress of Iranian Orthopedic Surgeons Association, told the press conference that the congress is slated for October 15-19 at Tehran's Milad Tower to discuss the latest findings and discoveries in the field.

Razi said 200 lecturers from Iran and 12 foreign experts from France, Germany, the US, Canada, Hungary and the UK will participate in the congress.



Body Heat, Fermentation Drive Drug-Delivery Micropump

This new medical device does not require batteries because it's not powered by electricity. Instead, it's powered by yeast fermentation.

Researchers have created a tiny pump, designed to transfer drugs into the body through a patch, that is powered by the carbon dioxide produced by ordinary baker's yeast when the yeast fungi eat, Discovery News reported.

Medical patches allow drugs to diffuse into the body through the skin--nicotine patches and contraceptive patches are common--but

many medicines have molecules that are too large to pass through the skin without help.

Several researchers have worked on making micropumps that would help push larger drugs into the body through a patch of microneedles that pierce the skin painlessly.

Babak Ziaie, an engineer at Purdue University in Indiana, happened to make one with an unusual power source. “This just needs yeast, sugar, water and your own body heat,” Ziaie said in a statement.

The new pump is a small, flexible silicone bubble with two chambers. The first chamber holds the drug and has a tiny tube coming out of it, to carry the drug into the body. The second chamber holds a mixture of yeast and sugar. Yeast microorganisms normally eat sugar, but without water or heat, they stay dormant and don’t eat.

When researchers inject water into the pump and place the pump on someone’s skin, the person’s body heat is enough to activate the yeast. The one-celled organisms start eating the sugar and producing carbon dioxide as waste, a reaction that’s familiar to home bakers who have activated a packet of yeast before adding it to a bread recipe.

The carbon dioxide eventually inflates the yeast-and-sugar chamber of the pump bubble, putting pressure on the other chamber to pump out some of its drug.

Ziaie and a doctoral student studying with him, Manuel Ochoa, built a half-inch (15 millimeters) prototype that pumps continually for more than two hours, they reported in August in the journal Lab on a Chip. They envisioned people just throwing away the patch

after the reaction was over.

“A yeast-powered pump may be less bulky than battery-powered pumps other researchers have made,” Ziaie said. Yeast fungi also are able to live for a long time in a dried state, so patches using a yeast pump should last a long time.