2014학년도 울산대학교 의과대학 수시 의학논술고사 문제지 (6-1)	수험번호	이름

1. 다음 지문을 읽고 아래 질문에 답하시오. (50점)

The Greeks, including Hippocrates, pondered heredity. They devised a theory of "pangenesis," which claimed that sex involved the transfer of miniaturized body parts: "Hairs, nails, veins, arteries, tendons and their bones, albeit invisible as their particles are so small." This idea enjoyed a brief Renaissance when Charles Darwin, desperate to support his theory of evolution by natural selection with a viable hypothesis of inheritance, put forward a modified version of pangenesis in the second half of the nineteenth century. In Darwin's scheme, each organ — eyes, kidneys, bones — contributed circulating "gemmules" that accumulated in the sex organs, and were ultimately exchanged in the course of sexual reproduction. Because these gemmules were produced throughout an organism's lifetime, Darwin argued that any change occurred in the individual after birth, like the stretch of a giraffe's neck imparted by craning for the highest foliage, could be passed on to the next generation. Ironically, Darwin came to champion aspects of Jean-Baptiste Lamarck's theory of inheritance of acquired characteristics. Darwin supposed that natural selection operated on the variation produced by pangenesis. Had Darwin known about Mendel's work, he might have been spared the embarrassment of this late-career endorsement of some of Lamarck's ideas. Whereas pangenesis supposed that embryos were assembled from a set of minuscule components, another approach, "preformationism," avoided the assembly step altogether: either the egg or the sperm contained a complete preformed individual from birth called a "homunculus". Development was therefore merely a matter of enlarging this into a fully formed being. In the days of preformationism, what we now recognize as genetic disease was variously interpreted.

minuscule: 아주 작은

1-1. "**Pangenesis**" 와 "**Preformationism**"의 내용을 요약 설명하시오. (300자 이내, 30점)

1-2. 실험용 쥐의 꼬리를 절단하여 자라지 않도록 한 다음, 꼬리가 절단된 쥐들끼리 번식하도록 하였다. 몇 세대 동안 동일한 번식 방법을 유지하였지만, 후대에 꼬리가 없는 쥐가 생산되지는 않았다. 이 실험 결과는 위의 "**Pangenesis**" 와 "**Preformationism**" 이론 중에서 어느 것이 틀렸다는 것을 의미하는지 기술하시오. (200자 이내, 20점)

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2. 가난이 인지 (지적) 능력에 영향을 주는 이유를 기술하시오. (200자 이내, 30점)

The poor often behave in less capable ways, which can further perpetuate poverty. We present two studies that test our hypothesis. First, we experimentally induced thoughts about finances and found that this reduces cognitive performance among poor but not in well-off participants. Second, we examined the cognitive function of farmers over the planting cycle. We found that the same farmer shows diminished cognitive performance before harvest, when poor, as compared with after harvest, when rich. This cannot be explained by differences in time available, nutrition, or work effort. Nor can it be explained with stress. Although farmers do show more stress before harvest, that does not account for diminished cognitive performance. Instead, it appears that poverty itself reduces cognitive capacity. We suggest that this is because poverty-related concerns consume mental resources, leaving less for other tasks. The data reported here suggest a different perspective on poverty. Being poor means coping not just with a shortfall of money, but also with a concurrent shortfall of cognitive resources. The poor, in this view, are less capable not because of inherent traits, but because the very context of poverty imposes load and impedes cognitive capacity.

cognitive: 인지의, 인식의, 지적인　　well-off: 부유한, 부자의

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3. 최근 유엔은 비감염성 질환을 주요 의제로 설정하고, 개인이 아닌 국가나 사회의 문제로 인식하여 대처해야 한다고 선언한 바 있다. 이러한 선언의 근거를 기술하시오. (200자 이내, 30점)

Commonly known as chronic or lifestyle-related diseases, the main non-communicable diseases are cardiovascular diseases, diabetes, cancers and chronic respiratory diseases. This four main non-communicable diseases have emerged relatively unnoticed in the developing world and are now becoming a global epidemic. However, such diseases could be significantly reduced and prevented, with millions of lives saved and untold suffering avoided, through proven and affordable measures, many of which are complementary to global health efforts already under way. The knowledge and technology to fight the onset and effects of non-communicable diseases already exist. It's time to act to save future generations from the health and socio-economic harm of such diseases. In 2008, 36 million people died from non-communicable diseases, representing 63% of the 57 million global deaths that year. However, the demographic of lives lost is not readily apparent; people with non-communicable diseases often die young, with 9 million annual deaths occurring in persons under 60 years of age. The epidemic is fuelled by a combination of rising risk factors, including tobacco use, an unhealthy diet, lack of physical activity and harmful alcohol use. The four main non-communicable diseases that share those risk factors cause almost 80% of all deaths from such diseases. Non-communicable diseases affect the developing world and lower-income populations hardest. Strong evidence links poverty, lack of education and other social determinants to such diseases and their risk factors. A vicious cycle is created by the epidemic, whereby non-communicable diseases and their risk factors worsen poverty, while poverty results in rising rates of such diseases.

non-communicable disease: 비감염성 질환
cardiovascular disease: 심혈관 질환
diabetes: 당뇨병
respiratory disease: 호흡기 질환
demographic: 인구학의

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4. **Brenner** 등의 연구와 비교할 때 **Pearce** 등이 수행한 연구의 차이점과 그 의의를 서술하시오. (200자 이내, 30점)

CT scans deliver a dose of ionizing radiation to the body part being scanned and to nearby tissues. Even at relatively low doses, ionizing radiation can cause damage to genes that may increase a person's risk of developing cancer. Children typically face a higher risk of cancer from ionizing radiation exposure than do adults exposed to similar doses. More than a decade ago, Brenner and colleagues' landmark report suggested that radiation doses attributed to pediatric CT scans would lead to a significant number of excess cancer deaths. The risk estimates produced for pediatric CT in that study were derived from risk projection models based on studies of survivors of the atomic bombs in Japan. Many differences exist between a CT scan and exposure to an atomic bomb - for example, CT scans are usually focused on a particular part of the body, whereas atomic bomb exposures affected the whole body. Investigators took these differences into account in so far as possible in the models used to estimate CT scan risks, but were the predictions correct? Many medical practitioners suggested that the evidence for cancer risk associated with CT scanning was speculation. Indeed, no epidemiological study had been published that convincingly showed increased incidence of cancers associated with low-dose radiation from medical imaging during childhood or adulthood. Now, a study by Pearce and colleagues in *The Lancet* enters the fray. The authors investigated a cohort of 178,604 children without cancer who underwent CT between 1985 and 2002 in various hospitals in England, Scotland, and Wales. They estimated radiation doses to individual organs, and identified subsequent cancers via linkage to the National Health Service Central Registry. In this study, the researchers found a clear relationship between the increase in cancer risk and increasing cumulative dose of radiation. A three-fold increase in the risk of brain tumors appeared following a cumulative absorbed dose to the head of 50 to 60 mGy. Similarly, a three-fold increase in the risk of leukemia appeared after the same dose to bone marrow (the part of the body responsible for generating blood cells).

CT: 컴퓨터 단층 촬영.
Ionizing radiation: 전리 방사선
epidemiological: 역학적
cohort: 공통된 특징을 가지는 집단
leukemia: 백혈병
(radiation) dose: (방사선) 선량 혹은 조사량
pediatric: 소아의
fray: 싸움, 소동
cumulative (absorbed) dose: 누적 (흡수) 선량
mGy: 전리 방사선 흡수선량의 단위

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5. **Gonadotropin releasing hormone agonists (GnRHa)**를 이용한 치료에 대하여 회의적으로 보는 근거를 기술하시오. (250자 이내, 30점)

Chief among the concerns of young cancer patients is that the treatment of their disease will affect future fertility. Oogenesis occurs *in utero* and women are born with a finite number of oocytes; this pool of oocytes is gradually depleted leading to the cessation of menses and menopause. Chemotherapy affect fertility by accelerating this depletion of the ovarian follicle pool. Several observation studies have suggested that gonadotropin releasing hormone agonists (GnRHa) may provide protection from chemotherapy and decrease the risk of ovarian failure. Although the results have been conflicting, some studies have shown a reduction in post-chemotherapy amenorrhea. However, studies have been difficult to compare as the definition of amenorrhea has differed between the clinical studies, and the standard use of other drugs in women with hormone-sensitive cancer can also result in amenorrhea. In addition, it is important to remember that the return of menses is not an accurate measurement of fecundity. In natural reproductive aging, women lose fecundity almost a decade before the loss of menstrual cycles. Until further research with pregnancy outcome, GnRHa therapy can be considered to potentially reduce the risk of premature ovarian failure in women undergoing chemotherapy but should not be considered an established method of fertility preservation.

oogenesis: 난자 생성
oocytes: 난자
chemotherapy: 항암화학치료
follicle: 난포
gonadotropin releasing hormone agonist: 성선자극호르몬분비호르몬 작용제
amenorrhea: 무월경
fecundity: 임신능력

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6. **Intraoperative awareness with recall (IAWR)** 발생의 위험요인과 예방을 위해 고려해야할 사항에 대하여 기술하시오. (250자 이내, 30점)

Intraoperative awareness with recall (IAWR) is one of the serious complications of anesthesia and can cause secondary psychic problems. Awareness might be necessary for a patient to recall what happens to them during surgery, but it is not sufficient. The term of “awareness” is a synonym for conscious perception, and the phenomenon that is actually measured is “memory”, unlike conscious perception, is absolutely dependent on processes occurring in the hippocampus and other medial temporal lobe structures. And, as was so clearly demonstrated by the famous amnesiac Henry Molaison, who had both hippocampi removed surgically in an attempt to treat a seizure disorder, it is entirely possible to have awareness without forming and sustaining memory of the experience. There are several studies about the etiologies of IAWR. Aranake et al. assess whether patients with a history of IAWR are actually higher risk for IAWR under general anesthesia. The patients drawn from these trials including more than 25,000 patients, those with a self-reported history of IAWR have five-fold increased incidence of IAWR compared with controls who did not have a history of IAWR. This result means previous IAWR are closely related to development of new IAWR. Also in IAWR group, the anesthetic depth represented by bispectral index is significantly light, indicating “awareness”, compared to control group under same dose of anesthetics. This means IAWR patients are less reactive to anesthetics, the reason is not definitely known, but genetic difference is supposed to be. In view of the likely increased risk of IAWR, clinicians should consider modifying anesthetic management in patients with a history of IAWR.

intraoperative awareness with recall (IAWR): 수술 후 기억하는 수술 중 각성
hippocampus: 기억에 관여하는 뇌의 부분
seizure: 경련
amnesiac: 기억상실의
general anesthesia: 전신마취
bispectral index: 마취깊이를 나타내는 지표
anesthetics: 마취제