熊本大学　一般

平成２５年度　後期日程入学試験問題

小論文（120 分）

医学部医学科

（注意事項）

１．問題冊子及び解答紙は試験開始の合図があるまで開かないこと。
２．問題は２頁、解答紙は２枚ある。
　なお、別に下書き用紙１枚を配布する。
　問題冊子及び解答紙の印刷不鮮明、落丁・乱丁及び汚れ等に気付いた場合は、手を挙げて監督者に知らせること。
３．試験開始後、各解答紙の所定欄に受験番号を必ず記入すること。
４．解答は、各解答紙の指定された箇所に記入すること。
５．解答紙に関係のないことを書いた場合は、無効にすることがある。
６．解答紙は、どのページも切り離してはならない。
７．解答紙は持ち帰ってはならない。
８．試験終了後、問題冊子及び下書き用紙は持ち帰ること。

下記の英文を読んで、設問に答えなさい。

The discovery that cells can be reprogrammed to an embryonic [脚注1]-like state has won this year's Nobel Prize in Physiology or Medicine for two leading lights of stem-cell [脚注2] research: John Gurdon and Shinya Yamanaka. Reprogrammed cells regain pluripotency [脚注3], the potential to differentiate into many mature cell types. Many researchers hope that cells created in this way will eventually be used in regenerative medicine [脚注4], providing replacement tissue for damaged or diseased organs. The field has become one of the hottest in biology, but the prizewinners' discoveries were not without controversy when they were made.（下線１）

Gurdon was the first person to demonstrate that cells could be reprogrammed, in work published 50 years ago. At the time, scientists believed that cellular specialization was a one-way process that could not be reversed. Gurdon overturned that dogma by removing the nucleus [脚注5] from a frog egg cell [脚注6] and replacing it with the nucleus from a tadpole's intestinal cell [脚注7]. Remarkably, the process was able to turn back the cellular clock of the substitute nucleus. Although it had already committed to specialization, inside the egg cell it acted like an egg's nucleus and directed the development of a normal tadpole.

Gurdon was a graduate student at the University of Oxford, UK, when he did the work. He received his doctorate in 1960 and went on to do a postdoc [脚注8] at the California Institute of Technology, leaving his frogs in Europe. He did not publish the research until two years after he got his PhD [脚注9], once he was sure that the animals had matured healthily. "I was a graduate student flying in the face of [established] knowledge（下線２）," he says. "There was a lot of scepticism [脚注10]."

Mammalian cells did not prove as amenable [脚注11] to this process, known as cloning [脚注12] by nuclear transfer, as frog cells. It was nearly 35 years before the first cloned mammal — Dolly the sheep — was born, in 1996. Dolly was the only live birth from 277 attempts, and mammalian cloning remained a hit-and-miss affair. Scientists were desperate to improve the efficiency of the system and to understand the exact molecular process involved（下線３）. That is where Shinya Yamanaka of Kyoto University, Japan, made his mark. In the mid-2000s, the stem-cell community knew that Yamanaka was close. "I remember when he presented the data at a 2006 Keystone symposium," says Cédric Blanpain, a stem-cell biologist. "At that time he didn't name them and everyone was betting what these magic factors could be." A few months later, attendees at the 2006 meeting of the International Society for Stem Cell Research in Toronto, packed out Yamanaka's lecture. The audience waited in silence before he announced

his surprisingly simple recipe: activating just four genes was enough to turn adult cells called fibroblasts [脚注13] back into pluripotent stem cells.

Yamanaka began his career as a surgeon, but, he said, "I had no talent for it, so I decided to change my career from clinics [脚注14] to laboratories". "But I still feel that I am a physician — my goal, all my life, has been to bring stem-cell technologies to clinics."

出典：Cell rewind wins medicine Nobel. Nature 490: 151, 2012 より一部抜粋。

脚注１ embryonic: 胎生の、脚注２ stem-cell: 幹細胞（無制限に分裂可能な未分化細胞）、脚注３ pluripotency: 多能性、脚注４regenerative medicine: 再生医療、脚注５ nucleus: 核、脚注６ egg cell: 卵細胞、脚注７ tadpole's intestinal cell: オタマジャクシの腸細胞、脚注８ postdoc: 博士研究員、脚注９ PhD: 博士号、脚注１０ scepticism: 疑い、脚注１１ amenable: 扱いやすい、脚注１２ cloning: クローン生物作製、脚注１３ fibroblast: 線維芽細胞、脚注１４ clinic: 臨床

設問

設問１　下線１で示した文章を 140 字以内で日本語（横書き）に翻訳しなさい（40 点）。

設問２　下線２の[established] knowledge とはどのようなことを意味しているか。45 字以内の日本語（横書き）で答えなさい（20 点）。

設問３　下線３で示した文章を 210 字以内で日本語（横書き）に翻訳しなさい（40 点）。

設問４　医師が研究を行うことについてあなたはどのように考えますか。研究に携わることは望ましいことであろうか、それとも医師は診断や治療など臨床に専念すべきか。本文の内容にとらわれず、あなた自身の意見を、理由を付して 500 字以内の日本語（横書き）でまとめなさい（100 点）。