

基因编辑 (文章)

Gene Editing (Article)

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昏睡了几天，醒来发现人类“进化”竟已经匆忙向前迈出如此阔大一步。

After sleeping lethargically for a few days, I woke up and discovered humanity's evolution has rushed ahead in a giant step.

在漫长的生物进化史中，人类基因库的基因多态性保证了这个物种在一次次天灾人祸中幸存下来，并发展到如今独占生物界鳌头的地位。有了意识之后，生物第一问就是：我是谁？我来自哪里？我要去往何处？历史长河滚滚而行，在争论不休中，在偶然的必然中，人类发现上帝原来安排的是基因，无数分子列队其中，互相配合，互相调控，互相牵制，如此精巧绝伦、天衣无缝的设计，让见者无不叹为观止、心生敬畏、意欲深知。“聪明绝顶”的人类在探本溯源的强大动力驱使下，创造出各式各样的新技术、新方法。其中之一，基因编辑技术应运而生。于是，掌握了该技术的人感到自己的手也可以是上帝之手，感到自己原来离神这么近。如果植物基因编辑还是人类“驯服”自然界、“改造”自然的升级，为了能够得到更多理想的食物与资源，那么针对人类自己基因修饰胎儿的降生真的就是事关千秋万代的大事件了。这不是韩式整形美容，不是个体开个眼角、拉个双眼皮、纹个眉，或者注射玻尿酸、肉毒素的障眼法，因为基因的修饰直接写进了生殖细胞中，然后随着代间传递，逐渐融合进整个种群。

In the long history of biological evolution, not only has humanity's gene pool survived disaster after disaster but it has progressed to reach the zenith. After self-awareness, the first question a biological creature has is "Who am I? Where do I come from? Where do I want to go?". The long river of history rolls by and amongst the endless debate, in a rare case of inevitability, humanity discovered that what God really has given is genetics – an infinite line of molecules combining, controlling and containing each other. Such peerless ingenuity done so flawlessly leaves only the viewer to be lost in wonder and desire to understand. The "smartest" humans, spurred by the drive to understand the

origin, created a variety of new techniques and methods. Among them, gene editing emerged naturally. Thus, for man who has grasped this technology, he felt that his hands can also be God's hands and he's so close to being God. If modifying the genes of plants is man "taming" and "improving" the natural world in order to acquire more ideal food and resources, then to direct genetic embellishment towards a human birth is really a matter of great concern. This is not just the Korean style of correcting outer beauty, i.e. open the eyes, fold the eyelids, remove a wrinkle, inject Botox and other methods of deceptive camouflage; this is because genetic modification directly writes into the organism's genes which can be passed into the next generation to gradually merge into the population.

令整个科学界哗然的原因也显而易见。首先，目前基因剪辑技术的相对不成熟，“脱靶”的风险巨大，无辜基因若被累及后果无法预知，正常人类都可能对此充满焦虑与不安。其实，这个问题可以解决，方法就是全基因组测序，比较基因编辑前后的变化，如果只是目标基因实现了理想突变，那么这个焦虑就有了解药。而关键在于，人类目前对于每一个基因的认知还处于初级阶段，对所修改的基因在每一个功能细胞、完整生命体乃至整个种群中的作用知之甚少，而修改所造成的后果可能很快、也可能很多代后才能表现出来，人类对未知的敬畏之心使有识之士不能不焦虑。在这里不能不想到以希特勒为代表的法西斯，主观认定波兰犹太人是奸诈狡猾的劣等种族，认为华夏子孙是软糯无知的东亚病夫，所以必屠之而后快。整个人类因为二战遭遇了何等惨烈的创伤？是人都不能不以此为警。而到基因的层面上，此理同样适用。这个问题不好解决，毕竟不执行不见不知。

What causes a commotion in the scientific world is obvious. First, currently gene editing technology is relatively immature and with the enormous possibility of "missing the target", the aftermath of an unforeseen implication is hard to predict. The common person may be quite worried towards this. In actuality, this question can be resolved by testing a gene pool – determining whether there's any change before or after. If the target gene realizes the ideal change, then this has relieved the concern. Also what's important is that humanity's current understanding of every gene is still at its nascent stage where; we know very little when editing a particular gene whether it's to alter the functionality of a particular cell, a particular lifeform or a particular group. No wonder that

humanity's fear of the unknown causes those with foresight to be concerned. Here, the thought indubitably turns to that of Hitler representing the Fascists whose core belief held that Jewish people are a despicable deceptive inferior race and those who held that the Chinese are the sick men of Asia which needs a quick massacre. Because of World War 2, the entire human race cannot help but be wary. Similarly, genetics should be thought of on the same level. This issue is hard to resolve and clearly cannot be existed without knowledge.

如果搁下该问题，继续分析。假设人类可以任意修改每一个基因，并且不会引起显而易见直接导致个体异常的变异。那么，针对防护 HIV 的基因可以编辑修改，针对其他病毒的基因当然若被发现也均可以修改，进一步放大，影响身高、体型、毛发等生理特征，甚至影响 EQ、IQ 的基因若被证实相关性都被随心所欲的编辑，短时间内，街上到处出现的不再是整形美容医院，而是基因编辑工作室、胎儿定制中心。大众原本的生活信条将被彻底颠覆，不惜抛弃进化无数年才成就的今天这个自己，创造一个个“符合”预期的新生命。更长久一些时间，符合主流审美的基因遍布各个角落，他们具有相似的容貌特征、相似的言行举止、相似的审美癖好。可以预期，基本的，这个世界将变得单调、枯燥。另外，不要忘了，宇宙是运动的，不知道怎样一场灾害，正好这种一致性基因无法对抗，那时候，人类文明也就永远消失了。

If we set aside this question and continue our analysis, let's imagine that humanity can edit any gene. In addition, editing the gene won't cause any abnormal changes. Then, the gene edit to protect against HIV as well as other viruses will obviously be implemented. Magnifying this further, what affects the height, physique, hair and whatever other features in addition to EQ and IQ will be edited to the heart's content. In a short time, there won't be plastic surgery clinics but rather gene editing clinics and infant setup centers. People's former meaning of life will now be completely flipped and they'll happily throw away the self that took countless years of evolution. To project towards the future some more, what is considered the ideal beauty has now spread to every world where now everyone has the same physical characteristics, the same words and actions and the same perceptions of beauty. We can project that this world from the basic level is uniform and dull. Also, don't forget that the universe changes and

we don't know if there's one disaster that would wipe out everyone with a certain gene. By that point, humanity's culture would have disappeared forever.

当然了，这中间也有许多不确定，比如主流审美的难以统一性。以中国为代表的亚洲审美群体，双眼皮、高个子、瘦、白皮肤被认为是美的典范，伴随医学发展与整容业的兴盛，这些在今极易达成，极其相似的网红脸已经遍布在我们的生活中。但是，在欧美群体中，大部分人都是双眼皮、高个子、白皮肤，极其稀松平常的存在，不再会认为这是值得动刀子去追求的美，他们更欣赏天然的独特与个性的鲜明。所以，未来的走向也未必那么悲观。

Of course, there's a lot of uncertainty in the middle, e.g. what is considered beautiful is hard to classify into one. For Chinese, what is considered ideally beautiful is double-lidded, high height, thin and white skin. Today, this is currently achievable with many doing exactly this in our lives. However, among the population of Westerners, most people are double-lidded, tall and have white skin; they would not consider reaching this ideal is worth cutting open with a knife. They appreciate more a natural uniqueness and a vivid personality. Thus, the future direction may not be that miserable.

在头昏眼花状态下，信口絮叨如此一堆，还望智者无嫌我见识浅薄。那么多无辜吃瓜群众听着新奇，看着热闹，在如昙花一现的生命旅途中能见到如此胜景实在不虚此行。人类的明天会怎样？不管你愿不愿意，迟早要来的已经到来，你准备好拭目以待了么？绝大多数人可能更关心明天的午餐会不会合口味。

Thankfully I was able to spit out this pile in a groggy state; hopefully, those who know won't think my knowledge is shallow. Those innocent bystander readers who are just here for amusement, in a life that is as brief as a flower, to see such wonderful scenery is not a journey taken in vain. What will be humanity's future? Whether you're willing or not, with this inevitable future coming, are you prepared to see it? Perhaps, most people care more about whether tomorrow's lunch is palatable.