

Publishing SNP Genotypes of Human Embryonic Stem Cell Lines: Policy Statement of the International Stem Cell Forum Ethics Working Party

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Abstract Novel methods and associated tools permitting individual identification in publicly accessible SNP databases have become a debatable issue. There is growing concern that current technical and ethical safeguards to protect the identities of donors could be insufficient. In the context of human embryonic stem cell research, there are no studies focusing on the probability that an hESC line donor could be identified by analyzing published SNP profiles and associated genotypic and phenotypic information. We present the International Stem Cell Forum (ISCF) Ethics Working Party's Policy Statement on "*Publishing SNP Genotypes of Human Embryonic Stem Cell Lines (hESC)*". The Statement prospectively addresses issues surrounding the publication of genotypic data and associated annotations of hESC lines in open access databases. It proposes a balanced approach between the goals of open

science and data sharing with the respect for fundamental bioethical principles (autonomy, privacy, beneficence, justice and research merit and integrity).

Keywords Embryonic stem cells · Data sharing · Ethics · Policy · Databases · SNPs · Genotypic data

The International Stem Cell Initiative (ISCI) [1]—launched under the auspices of the International Stem Cell Forum (ISCF) [2]—is a worldwide collaborative effort to establish basic criteria and techniques to underpin the development of applications for hESC in human medicine. The Initiative has collected comprehensive background information on individual cell lines (e. g. derivation and maintenance conditions) in order to systematically study hESC in an effort to establish international standards for characterization.

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The data from ISCI form the basis for the ISCI Human ES Cell Registry [3]. It is used as a reference in other stem cell registries such as the European hESCreg.

The ISCI is characterizing genotypically different hESC lines isolates using high density Illumina BeadArrays to interrogate the samples for a range of genomic features. The particular BeadArray chosen is the HUMAN 1M-DUO v3. The 1M-DUO array provides a very high coverage of genome markers in general and in particular single nucleotide polymorphisms (SNP's). This high density coverage means that very detailed information about a cell line's genotype will be gathered, and by implication also about the donors of the gametes or of other cells that gave rise to the cell lines.

In contrast to the genotype of cell lines derived from a single donor, the genotype of a hES cell does not correspond directly to the genotype of the individuals who donated the embryo from which the hES cell line was derived. There is effectively no possibility of donor identification based solely upon the genotype of a hESC line, and hence, the genotype of the embryo from which it was derived. Nevertheless, it may still be possible to infer some genomic information about the gamete donors. Under remote circumstances and solely when additional information is available regarding the donation (e.g. date, place of embryo donation together with information about the genotype of the donor) might it be possible to identify a donor.

For the immediate purposes of the ISCI study, it is not necessary to identify the genotypes of individual cell lines, but rather to present conclusions derived from aggregating the individual data. However, upon completion of the project, the International Stem Cell Initiative (ISCI) will be in possession of scientifically useful information about the genotypes of the individual cell lines which could be

published in the scientific literature and may be lodged in the ISCI Human ES Cell Registry.

Novel methods and associated tools—such as the ones described above—permitting individual identification in publicly accessible SNP databases have become a debatable issue [4, 5]. There is concern that established safeguards to protect the identities of donors could be insufficient [6]. In the context of stem cell research, however, there are no studies focusing on the probability that similar methods and tools could be used to identify a hES cell line donor by analyzing published SNP profiles and associated phenotypic information.

It is the sense of the EWP that the likelihood of revealing donor identity is remote. While revealing donor identity is improbable, potential donors should be made aware that genotypic data may be in the public domain. However, in an area of research moving toward therapies and where donors of embryos provided hES cells under conditions of anonymity, a proportional approach to privacy requires examining the probability of identifiability as well as the balancing of risks and benefits. As stated by the Data Protection Working Party of the European Commission, Opinion 4/2007:

“... a mere hypothetical possibility to single out the individual is not enough to consider the person as “identifiable”. If, taking into account “*all the means likely reasonably to be used either by the controller or by any other person*” that possibility does not exist or is negligible, the person should not be considered as “identifiable” and the information would not be considered as “personal data” [7].

Thus, it is the view of the EWP that already existing hESC lines should be placed in open access databases if in the opinion of their curator there is no reason to believe that

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such data should not be made public, and that their publication complies with both the donor's original informed consent and with national regulations.

The overall aim of the International Stem Cell Forum is to promote global good practices through collaboration in stem cell research. While recognizing ethical and legal constraints, the ISCF supports the sharing of data with the international community to accelerate progress in this vitally important area of biomedical science. The ISCF is respectful of the privacy of the individuals who contribute to the advancement of the field via the donation of their biological materials. To achieve these aims, while respecting fundamental bioethical principles such as beneficence, justice and research merit and integrity, the ISCF EWP recommends the following policy:

ISCF Ethics Working Party Policy Statement

The goal of open science and the principle of transparency argue in favour of maintaining open access databases, even when faced with scenarios of possible—yet extremely unlikely—identification of donors. In the future, all genotypic data and associated annotations arising from the International Stem Cell Initiative (ISCI) should be organized and placed in an **Open Access Database**. Thus, the ISCF EWP encourages the scientific community to prospectively adopt appropriate **broad informed consent** protocols to govern future stem cell research involving genotypic information. To that end, such consent should foresee genotypic data eventually being placed in open access databases. Where possible, it should prospectively seek explicit consent for donor SNP data to be published in open access databases on the internet. However for

already existing lines, we also endorse open access databases where there is no reason to believe that such publication would contravene donor consent or applicable laws.

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