



(51) International Patent Classification:

C12N 1/20 (2006.01) C12N 15/67 (2006.01)
C12N 15/10 (2006.01)

(21) International Application Number:

PCT/EP2023/070049

(22) International Filing Date:

19 July 2023 (19.07.2023)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2210580.3 19 July 2022 (19.07.2022) GB
2217789.3 18 October 2022 (18.10.2022) GB

(71) Applicant: UNITED KINGDOM RESEARCH AND IN-
NOVATION [GB/GB]; Polaris House, North Star Avenue,
Swindon Wiltshire SN2 1FL (GB).

(72) Inventors: CHIN, Jason; c/o United Kingdom Research
and Innovation, Polaris House, North Star Avenue, Swin-
don Wiltshire SN2 1FL (GB). ZURCHER, Jerome; c/
o United Kingdom Research and Innovation, 2nd Floor,
David Philips Building, Polaris House, North Star Avenue,
Swindon Wiltshire SN2 1FL (GB). ROBERTSON, Wes-
ley; c/o United Kingdom Research and Innovation, Polaris

House, North Star Avenue, Swindon Wiltshire SN2 1FL
(GB).

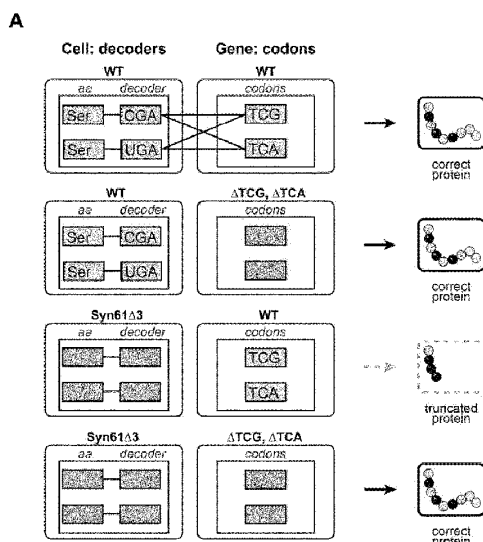
(74) Agent: COOLEY (UK) LLP; 22 Bishopsgate, London
Greater London EC2N 4BQ (GB).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG,
KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY,
MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA,
NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO,
RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH,
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS,
ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, CV,
GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST,
SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ,
RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ,
DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT,
LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE,

(54) Title: GENETIC CODES

Figure 1



(57) Abstract: Provided are cells that are resistant to mobile genet-
ic elements or horizontal gene transfer, and methods for obtaining
said cells. Also provided are methods for preventing the horizontal
transfer of genetic information between a mobile genetic element
and a first cell, cells making use of new genetic codons schemes and
related subject matter, kits comprising mutually orthogonal cells,
and mobile genetic elements. Also provided are methods of altering
the susceptibility of a gene to mutations that alter the encoded
amino acid sequence, methods for evolving or improving a protein,
and methods for rendering a target gene more resistant to mutation.
Additionally provided are uses of the cells for making polymers
and methods comprising using the cells for making polymers.

SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- *without international search report and to be republished
upon receipt of that report (Rule 48.2(g))*
- *with sequence listing part of description (Rule 5.2(a))*