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Declarations under Rule 4.17:

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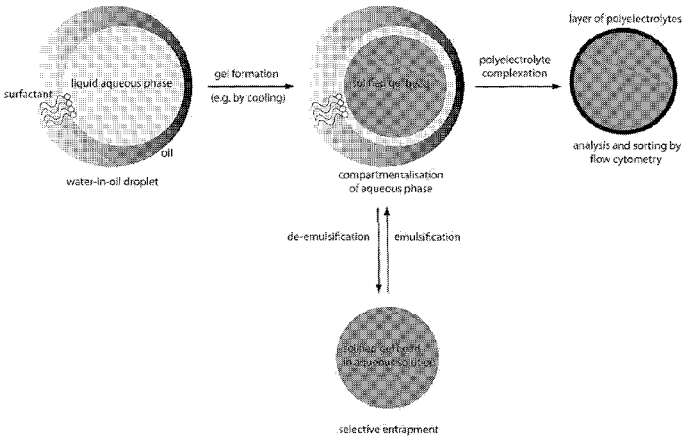
[Continued on next page]

(54) **Title**: GEL BEADS IN MICROFLUIDIC DROPLETS

Figure 1



(57) **Abstract**: This invention relates to the use of gel beads in microfluidic droplets to perform multi-step compartmentalised reactions in vitro. Methods may comprise emulsifying an aqueous reporter solution which comprises polynucleotides, a reporter substrate, and a gel-forming agent into microdroplets. Each polynucleotide encodes a product which converts the reporter substrate into a detectable reporter in the microdroplets. The gel-forming agent is then solidified within the microdroplets to produce gel beads comprising both the polynucleotide and the detectable reporter produced by the product. The aqueous microdroplets are then de-emulsified and re-suspended in aqueous detection solution and the reporter detected in one or more beads the population. These methods allow high throughput and are particularly useful for biochemical processes such as high-throughput screening, directed evolution and genotyping methods.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, BIOSIS, CAB Data, Sequence Search, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Name and mailing address of the ISA/	Authorized officer
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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