Claims

1. A two-part device forming a combined eAPC:eTPC analytical system, wherein a first part is an **engineered antigen-presenting cell system (eAPCS)**, and a second part is an **engineered TCR-presenting cell system (eTPCS)**,

wherein said eAPCS comprises

a first component which is an **engineered antigen-presenting cell (**eAPC), **designated component 1A**, wherein component 1A lacks endogenous surface expression of at least one family of analyte antigen presenting complexes (aAPX) and/or analyte antigenic molecules (aAM) and contains a second component **designated component 1B,** a **synthetic** genomic receiver site, for recombinase mediated cassette exchange (RMCE) integration of one or two ORFs encoding an aAPX and/or an aAM,and

a third component which is a genetic donor vector **designated component 1C,** for delivery and integration into 1B of ORF encoding aAPX and/or aAM, wherein component 1C is matched to component 1B, and wherein component 1C is designed to deliver one or two ORFs encoding an aAPX and/or an aAM

and wherein said one or two ORFs optionally also encodes a selection marker of integration, such that the aAPX and/or aAM can be expressed by component 1A.

2. A two-part device according to **claim 1** wherein said eTPCS comprises

a first component, which is an engineered TCR-presenting cell (eTPC), **designated component 2A**, wherein component **2A** lacks endogenous surface expression of at least one family of analyte antigen-presenting complexes (**aAPX**) and/or analyte antigenic molecule (**aAM**), lacks endogenous expression of TCR chains alpha, beta, delta and gamma, and expresses CD3 proteins which are conditionally presented on the surface of the cell only when the cell expresses a complementary pair of TCR chains and contains a second component **designated 2B**, a genomic receiver site for recombinase mediated cassette exchange (RMCE) integration of a single ORF encoding at least one analyte TCR chain of alpha, beta, delta or gamma, and/or two ORFs encoding a pair of analyte TCR chains, and

a third component is a genetic donor vector, **designated component 2C**, for delivery of ORF encoding analyte TCR chains, wherein **component 2C**, is matched to component 2**B**, and wherein the component 2**C** is designed to deliver

a. A single ORF encoding at least one analyte TCR chain of alpha, beta, delta and/or gamma and/or

b. Two ORFs encoding a pair of analyte TCR chains.

and wherein a and/or b optionally encodes a selection marker of integration, such that the analyte TCR chains can be expressed as TCR surface protein in complex with the CD3 (**TCRsp**) on component **A.**

3. A two-part device according to **claim 1 or 2** wherein **eAPCS** provides the one or more of analyte eAPC selected from at least one of :

a. eAPC-p,

b. eAPC-a,

c. eAPC-pa, and

d. a library of a, b or c.

4. A two-part device according to **claim 3,** wherein an eAPC-p, eAPC-a or eAPC-pa expresses an **analyte antigen** selected from

e. an aAPX or

f. an aAM or

g. an aAPX:aAM or

h. an aAPX:CM or

i. a combination thereof.

5. A two-part device according to any of the previous claims wherein **eTPCS** provides one or more analyte eTPC selected from

a. eTPC-t and

b. a library thereof.

6. A two-part device according to claim 5, wherein an analyte pair of TCR chains are expressed as TCR surface proteins in complex with CD3 (analyte **TCRsp**) by an analyte eTPC.

7. A two-part device according to claim 6, wherein the eTPC contains a component 2F, representing a synthetic TCR signal response element engineered to the genome of the eTPC, and which is used to report the formation of complex between analyte TCRsp and a analyte antigen presented by eAPC –p, -a or –pa, and which results in a signal response in the eTPC.

8. A two-part device according to any of the preceding claims, wherein one or more analyte eAPC, is combined with one or more analyte eTPC.

9. A two-part device according to **claim 8**, wherein the combination results in a contact between an analyte TCRsp and an analyte antigen as defined in claim 4, wherein the contact may or may not result in a signal response.

10. A two-part device according to **claim 9,** wherein the contact may result in the formation of a complex between the analyte TCRsp and the analyte antigen.

11. A two-part device according to **claim 10** wherein a formation of a complex, if any, can induce a signal response in the analyte eTPC and/or the analyte eAPC.

12. A two-part device according to any of claims 8-10, wherein the signal response is used to select an analyte eTPC or a pool of analyte eTPC with or without a signal response and/or analyte eAPC or a pool of analyte eAPC with or without a signal response.