CLAIMS

What is claimed is:

1. A distributed system for secure storage and retrieval of encrypted biological specimen data comprising:

a submission device client operable to:

send, to a patient record server device, a patient record; and

receive, from the patient record server device, a confirmation of receipt of the patient record; and

the patient record server device comprising:

a first processor and first memory, the patient record server device operable to:

create a patient blockchain that is empty at the start of a clinical trial, the patient blockchain corresponding to a patient enrolled in the clinical trial;

receive, from the submission device client, the patient record;

send, to the submission device client, the confirmation of receipt of the patient record;

receive, from a member device client, patient profile information;

determine search results based on the patient profile information;

send, to the member device client, information indicating the search results;

send, to the member device client, the search results based on the information indicating the search results;

update the patient blockchain during the clinical trial by adding blocks in a linear manner;

broadcast availability of the patient blockchain as updated during the clinical trial to network members at a conclusion of the clinical trial; and

update the patient blockchain with a record of third party access to a physical specimen corresponding to the patient blockchain; and

wherein the member device client is operable to:

send, to the patient record server device, the patient profile information;

receive, from the patient record server device, the information indicating the search results based on the patient profile information; and

receive the search results based on the information indicating the search results.

2. The system of claim 1, further comprising:

a submission device comprising:

a second processor and second memory, the submission device operable to:

execute the submission device client; and

a member device comprising:

a third processor and third memory, the memory device operable to:

execute the member device client.

3. The system of claim 1, further comprising:

the submission device client further operable to:

receive a first confirmation of a patient record provider credit from the patient record server device; and

the patient record server device further operable to:

store the patient record provider credit to update the patient blockchain;

send the first confirmation of the patient record provider credit to the submission device client;

store a member device client debit to update the patient blockchain;

send a second confirmation of the member device client debit to the member device client; and

store an operator credit to update the patient blockchain; and

the member device client further operable to:

receive the second confirmation of the member device client debit from the patient record server device.

4. The system of claim 1, further comprising:

the patient record server device further operable to:

receive, from the member device client, mined information;

store the mined information in a next member blockchain; and

send, to the member device client, a confirmation of storage of the mined information; and

the member device client further operable to:

mine the search results to extract mined information;

send, to the patient record server, the mined information; and

receive, from the patient record server, confirmation of the storage of the mined information.

5. The system of claim 1, further comprising:

the patient record server device further operable to:

assign an access fee to the patient record, the access fee being proportional to an amount of information stored in the patient record.

6. The system of claim 1, further comprising:

the submission device client, in order to send the patient record, further operable to:

receive first patient record information input based on a clinical trial;

send the first patient record information to the patient record server device;

receive second patient record information input based on a clinical trial; and

send the second patient record information to the patient record server device; and

the patient record server device, in order to receive the patient record, further operable to:

receive the first patient record information from the submission device client;

store the first patient record information to update the patient blockchain;

increase, in response to storing the first patient record information, the access fee associated with the patient record;

receive the second patient record information from the submission device client;

store the second record information to update the patient blockchain; and

increase, in response to storing the second patient record information, the access fee associated with the patient record.

7. The system of claim 1, further comprising:

the patient record server device, in order to facilitate a clinical trial, further operable:

receive a plurality of clinical trial patient records from a plurality of submission device clients corresponding to a plurality of clinical trial patients;

group the plurality of clinical trial patient records to form a clinical trial group of patient records;

restrict access, to the plurality of clinical trial patient records, to all the member device clients except for member device clients identified as clinical trial sponsor member device clients;

receive information signaling the end of clinical trial; and

provide access to the clinical trial group of patient records to other member device clients.

8. A patient record server device comprising:

a processor and a memory, the patient record server device operable to:

create a patient blockchain that is empty at the start of a clinical trial, the patient blockchain corresponding to a patient enrolled in the clinical trial;

update the patient blockchain during the clinical trial by adding blocks in a linear manner;

receive, from a submission device client, a patient record;

send, to the submission device client, a confirmation of receipt of the patient record;

receive, from a member device client, patient profile information;

determine search results based on the patient profile information;

send, to the member device client, information indicating the search results;

send, to the member device client, the search results based on the information indicating the search results;

broadcast availability of the patient blockchain as updated during the clinical trial to network members at a conclusion of the clinical trial; and

update the patient blockchain with a record of third party access to a physical specimen corresponding to the patient blockchain.

9. The patient record server device of claim 8, wherein the patient record server device is further operable to:

store a patient record provider credit to update the patient blockchain;

send a first confirmation of the patient record provider credit to the submission device client;

store a member device client debit to update the patient blockchain;

send a second confirmation of the member device client debit to the member device client; and

store an operator credit to update the patient blockchain.

10. The patient record server device of claim 8, wherein the patient record server device is further operable to:

receive, from the member device client, mined information;

store the mined information in a next member blockchain; and

send, to the member device client, a confirmation of storage of the mined information.

11. The patient record server device of claim 8, wherein the patient record server device is further operable to:

assign an access fee to the patient record, the access fee being proportional to an amount of information stored in the patient record.

12. The patient record server device of claim 8, wherein the patient record server device is further operable to:

receive a first patient record information from the submission device client;

store the first patient record information to update the patient blockchain;

increase, in response to storing the first patient record information, an access fee associated with the patient record;

receive a second patient record from the submission device client;

store the second patient record to update the patient blockchain; and

increase, in response to storing the second patient record, the access fee associated with the patient record.

13. The patient record server device of claim 8, wherein the patient record server device is further operable to:

receive a plurality of clinical trial patient records from a plurality of submission device clients corresponding to a plurality of clinical trial patients;

group the plurality of clinical trial patient records to form a clinical trial group of patient records;

restrict access, to the plurality of clinical trial patient records, to all the member device clients except for member device clients identified as clinical trial sponsor member device clients;

receive information signaling the end of clinical trial; and

provide access to the clinical trial group of patient records to other member device clients.

14. A method of securely storing and retrieving encrypted biological specimen data comprising:

creating, by a processor, a patient blockchain that is empty at the start of a clinical trial, the patient blockchain corresponding to a patient enrolled in the clinical trial;

updating, by the processor, the patient blockchain during the clinical trial by adding blocks in a linear manner;

receiving, by the processor, a patient record from a submission device client;

sending, by the processor, a confirmation of receipt of the patient record to the submission device client;

receiving, by the processor, patient profile information from a member device client;

determining, by the processor, search results based on the patient profile information;

sending, by the processor, information indicating the search results to the member device client;

sending, by the processor, the search results to the member device client based on the information indicating the search results;

broadcasting, by the processor, availability of the patient blockchain as updated during the clinical trial to network members at a conclusion of the clinical trial; and

updating, by the processor, the patient blockchain with a record of third party access to a physical specimen corresponding to the patient blockchain.

15. The method of claim 14, further comprising:

storing a patient record provider credit to update the patient blockchain,

sending a first confirmation of the patient record provider credit to the submission device client,

storing a member device client debit to update the patient blockchain,

sending a second confirmation of the member device client debit to the member device client, and

storing an operator credit to update the patient blockchain.

16. The method of claim 14, further comprising:

receiving mined information from the member device client,

storing the mined information in a next member blockchain, and

sending a confirmation of storage of the mined information to the member device client.

17. The method of claim 14, further comprising:

assigning an access fee to the patient record, the patient record access fee being proportional to an amount of information stored in the patient record.

18. The method of claim 14, further comprising:

receiving first patient record information from the submission device client;

storing the first patient record information to update the patient blockchain;

increasing, in response to storing the first patient record information, an access fee associated with the patient record;

receiving second patient record information from the submission device client;

storing the second patient record information to update the patient blockchain; and

increasing, in response to storing the second patient record information, the access fee associated with the patient record.

19. The method of claim 14, further comprising:

receiving a plurality of clinical trial patient records from a plurality of submission device clients corresponding to a plurality of clinical trial patients;

grouping the plurality of clinical trial patient records to form a clinical trial group of patient records;

restricting access, to the plurality of clinical trial patient records, to all the member device clients except for member device clients identified as clinical trial sponsor member device clients;

receiving information signaling the end of clinical trials; and

providing access to the clinical trial group of patient records to other member device clients.