

Technologies for Licensing

Centre for Cellular and Molecular Platforms (C-CAMP)



C-CAMP has a growing intellectual property portfolio of technologies from numerous institutes around India and also invests substantially in their development.

In this brochure, the Technology Transfer Office (TTO), at C-CAMP, Bangalore has collected and documented information on technologies under our management that your organization may be interested in to license.

For further discussion with our team please contact Dr. Taslimarif Saiyed, Director, C-CAMP at [techtransfer \[at\] ccamp \[dot\] res \[dot\] in](mailto:techtransfer@ccamp.res.in).



Sodium channel modulator peptide

Invention ID: CMP-005

The Novel Technology:

A 26 residue peptide (Am2766) of the 8-conotoxin family with the sequence CKQAGESCDIFSQNCCVG-TCAFICIE-NH₂ has been isolated and purified from the venom of the molluscivorous snail, *Conus amadis*, collected from the southeastern coast of India. Am2766 inhibits the decay of the sodium current in brain rNav1.2a voltage-gated Na⁺ channel, stably expressed in Chinese hamster ovary (CHO) cells. Unlike 6-conotoxins that have previously been isolated from molluscivorous snails, Am 2766 inhibits inactivation of mammalian sodium channels.

Applications:

The invention would be applicable to a wide range of diseases that involve sodium channel dysfunction such as Dilated Cardiomyopathy in the heart, and numerous neurological conditions due to inadequate sodium transport in the brain. A drug based on this peptide could be devised to treat conditions caused by sodium channel inactivation.

Advantages of the Technology:

Given the specificity of peptide-target binding characteristics, it is probable that a drug based on this novel peptide would demonstrate a higher efficacy against diseases or conditions involving sodium channel dysfunction

Other technologies/products in the space:

There are competing drugs in the market which include:

- Anticonvulsants (eg. Lamotrigine)
- Local anesthetics (eg those derived from cocaine or amides)
- A-803467: specific peptide-based blocker of Nav1.8 channels (SCN10A), developed by Icagen and Abbott Laboratories
- Many other sodium channel blocking conotoxins are known and vary in efficacy

Business Model:

The technology is at an Early-stage technology but Am 2766 (peptide) is shown to inhibit inactivation of mammalian sodium channels. Looking for partners to further refine the technology as well as commercialize it.

Patents and IP Status:

IN Granted Patent

Oral Mucositis plant extract mouthwash

Invention ID: CMP-011

The Novel Technology:

The present invention describes a herbal mouth wash with anti oral mucositis properties containing 5 plant ingredients- *Emblca officinalis* (dried fruit) *Terminalia chebula* (dried fruit), *Terminalia bellerica* (dried fruit), *Azadiracta indica* (leaf & bark), *Glycyrrhiza glabra* (root). The mouthwash also delays the onset of oral mucositis in patients undergoing radiation for oral cancer.

Applications:

This invention can be used in reducing radiation induced mucositis for the patients undergoing Radiotherapy for Head & Neck cancer.

Advantages of the Technology:

The medicines currently used to treat radiation induced oral mucositis are expensive and with varying benefits. So far, no effective drug has been recommended in preventing / reducing oral mucositis or minimizing the symptoms due to oral mucositis. This new herbal formulation is found to be very effective in delaying the development of mucositis and its symptoms. The analgesic usage by patients using herbal mouthwash was significantly low (p value=.0001). This new formulation is very cheap and convenient to use. The approximate cost of the single day dose of the mouthwash is only Rs 8.00.

Other technologies/products in the space:

- Access Pharmaceuticals – MuGard – mouthrinse
- Camurus – Episil – mouthwash
- ActoGenix – AG013- oral rinse

Business Model:

Mid-stage technology with clinical trials demonstrating efficacy of mouthwash reducing radiation induced mucositis for patients undergoing Radiotherapy for Head & Neck cancer.

Patents and IP Status:

IN Complete Patent filed
PCT application filed

Antipsychotic drug screening assay

Invention ID: CMP-004

The Novel Technology:

A novel assay method suitable for screening novel antipsychotics wherein the drugs may be selected based on the differential internalization of the 5HT_{2A} receptor in neuronal and non-neuronal cell lines effect for it to predict the extrapyramidal symptoms that may be induced by an antipsychotic without having to carry out *in vivo* experiments.

Applications:

A high-throughput screening assay of antipsychotic drugs to measure their ability to cause internalization of the serotonin receptor (5-HT_{2A}).

This invention could be developed as a kit to allow rapid screening of the drugs that may cause extrapyramidal symptoms, symptoms associated with motor neural network and movement.

Advantages of the Technology:

Technology can be used to predict drug efficacy as well as extrapyramidal symptoms that may be induced by an antipsychotic without having to carry out *in vivo* experiments.

Other technologies/products in the space:

Current pharmacological assays use the binding of and either the activation or inhibition of the receptor to determine the effects of various drugs and internalization has not been suggested as a significant indicator for efficacy of the drug or as a reason for side effects often seen. Current assay methods although they may predict drug efficacy, are not capable of predicting propensity for extrapyramidal symptoms or side-effects.

Business Model:

Early-stage technology. Proof-of-concept demonstrates that compounds/drug candidates may be selected based on the differential internalization of the 5HT_{2A} receptor in neuronal and non-neuronal cell lines. Technology is capable of being developed in high-throughput format to allow rapid detection of antipsychotic compounds as well predict the severity of extrapyramidal symptoms.

Patents and IP Status

US Granted Patent

EP Granted Patent

Potassium channel modulator peptide

Invention ID: CMP-006

The Novel Technology:

A novel 13-residue peptide Mo1659 has been isolated from the venom of a vermivorous cone snail, *Conus monile*. HPLC fractions of the venom extract yielded an intense UV absorbing fraction with a mass of 1659 Da. De novo sequencing using both matrix assisted laser desorption and ionization and electrospray MS/MS methods together with analysis of proteolytic fragments successfully yielded the amino acid sequence, FHGGSWYRFPWGY-NH₂. Electrophysiological studies on the effect of Mo 1659 on measured currents in dorsal root ganglion neurons suggest that the peptide targets non-inactivating voltage dependent potassium channels.

Applications:

Potassium channels play a key role in regulation of cell membrane potential and modulation of cell excitability. Potassium channels are largely regulated by voltage, cell metabolism, calcium and receptor mediated processes. This novel peptide may have applications in neurological disorder research as well as the treatment or alleviation of disorders associated with potassium channel dysfunction, such as stroke, epilepsy, asthma, migraine, traumatic brain injury, spinal cord injury, sexual dysfunction, urinary incontinence and irritable bowel syndrome.

Advantages of the Technology:

Given the specificity of peptide-target binding characteristics, it is probable that a drug based on this novel peptide would demonstrate a higher efficacy against diseases or conditions involving potassium channel dysfunction.

The technology provides an opportunity to develop a peptide drug based on this novel peptide to target potassium channels and modulate activity. Numerous disorders are associated with potassium channel dysfunction, such as stroke, epilepsy, asthma, migraine, traumatic brain injury, spinal cord injury, sexual dysfunction, urinary incontinence and irritable bowel syndrome.

Other technologies/products in the space:

- 4-aminopyridine
- 3,4-diaminopyridine
- Many potassium channel blocking conotoxins are known and vary in efficacy

Business Model:

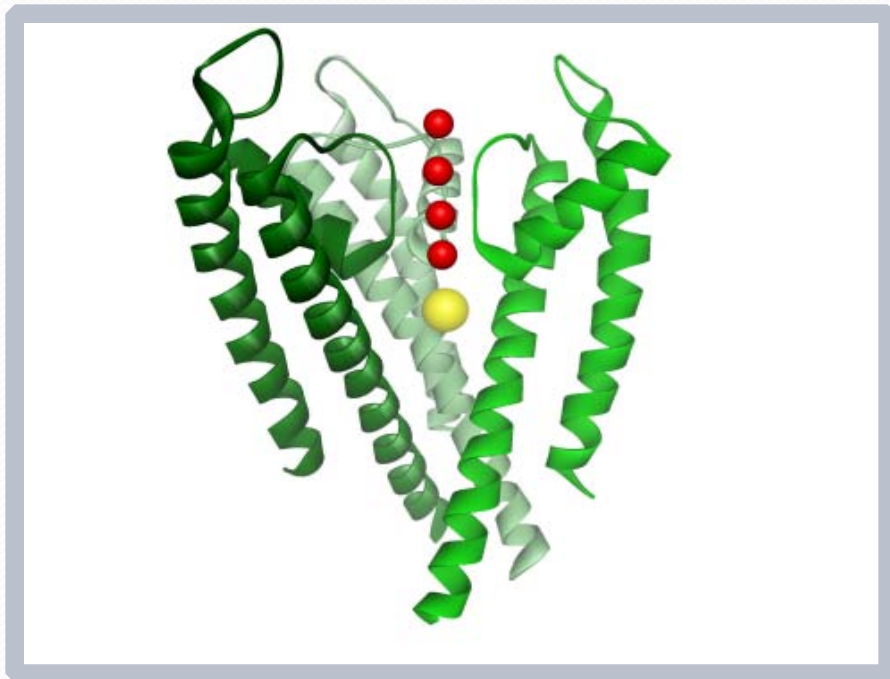
Early-stage technology but Mo1659 (peptide) shown to inhibit inactivation of mammalian potassium channels. Electrophysiological studies on the effect of Mo 1659 on measured currents in dorsal root ganglion neurons suggest that the peptide targets non-inactivating voltage dependent potassium channels.

Patents and IP Status:

IN Granted Patent

IL Granted Patent

US Patent (Notice of Allowance received)



Microfluidic device for long term *in vivo* imaging throughout development of transparent organisms

Invention ID: CMP-007

The Novel Technology:

To study developmental and cell biological phenomena occurring over longer time scales, it is often very useful to follow a single identified animal throughout its life cycle. Examples include cell migration, axon outgrowth, synapse remodeling and organelle dynamics. We have developed a simple growth and imaging PDMS device with food flow to track an individual *C.elegans* from the time of its hatching to adulthood.

Applications:

The *in vivo* measurements can easily be expanded to study other cellular process. The immobilization can be integrated with external fluidic systems like thermal management or chemosensory inflow for cellular studies in these model systems. In summary, our simple and easily accessible device can be readily used to study multiple developmental and cell biological events over the entire developmental period of an individual translucent organism.

Advantages of the Technology:

There are inventions in the microfluidic space that allow for immobilization and imaging at particular time points during development however, there are no Patents and IP Status or patent that specifically describe using microfluidic devices to immobilize, maintain and image *C.elegans* or any other organism within a microfluidic device throughout its development. Also, the invention may applied to organisms that have translucent life stages such as *C.elegans* and other nematodes, *Drosophila*, Zebrafish etc. In addition to this, tradition immobilization methods such as the use of anesthetics has been shown to interfere with neuronal networks and thus affect cellular trafficking.

The technology provides the opportunity to develop and optimize a novel device to allow real-time, live imaging of *C.elegans*, *Drosophila* larvae and Zebrafish larvae through development

Other technologies/products in the space:

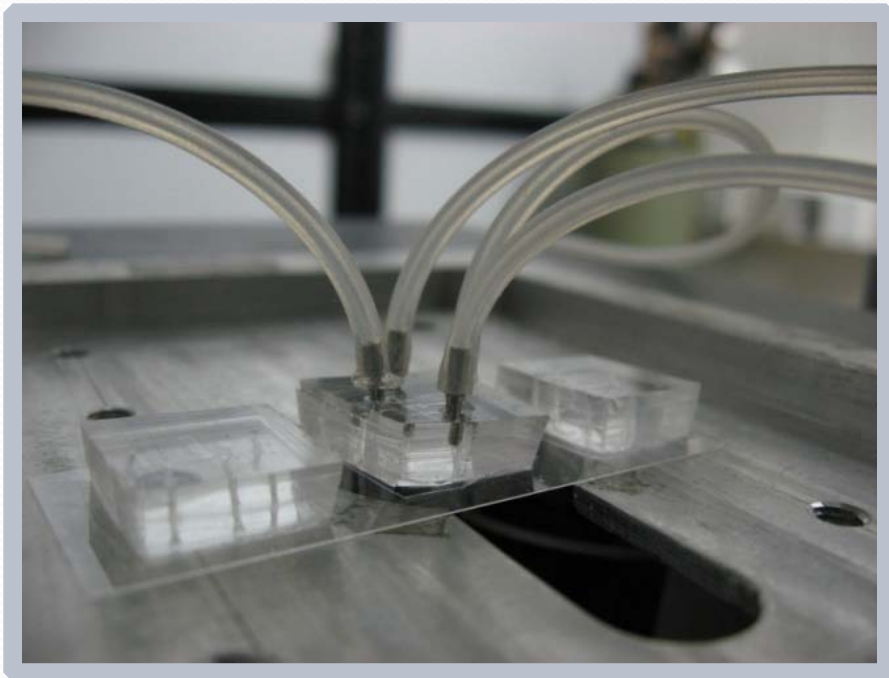
Although it is possible to for immobilize and image *C.elegans* at particular time points during development currently, there are no technologies that specifically demonstrate the ability to immobilize, maintain and image *C.elegans* or any other organism within a microfluidic device throughout its development.

Business Model:

Early-stage technology demonstrating immobilization without the use of anesthetics, provides a feeding mechanism, allows growth of the organism within the microfluidic device and is coupled to sub-cellular imaging which gives the added ability to visualize neuron movement within organism.

Patents and IP Status:

IN Provisional Patent filed



UTR-based gene expression detection method

Invention ID: CMP-013

The Novel Technology:

The present invention report a novel process (method) to study gene expression which utilizes a very rapid, economical and efficient way to detect specific UTR regions of mRNAs and hence gives quantitative information regarding target mRNAs.

Applications:

The utility of this method at the national and international level lies in its applications against specific cases of target genes involved in the medical and diagnostic field, research laboratories, agriculture domain etc. In addition to this, method has potential applicability in testing of agricultural produces, food quality analysis, and all gene expression studies.

Advantages of the Technology:

The major disadvantage of current methods such as northern hybridization for instance is the tedious and hazardous (often uses radioactive probes) nature of the experiment. Real-time PCR also is probe based, requires expensive equipment, reagents and often involves a long polymerization reaction. In addition sound experimental design and an in-depth understanding of normalization techniques are imperative for accurate conclusions. This approach combines the accuracy of northern in detecting the transcripts with the sensitiveness and easiness of probe based real time PCR whereas it excludes the tedious and delicate process of RNA hybridization during northern analysis and poor cost effectiveness of probe based fluorescent chemistry.

Other technologies/products in the space:

- Real-time PCR
- Northern blotting

Business Model:

The present invention is at an early stage and aims to develop a common platform for the rapid, economical detection and quantification of mRNA transcripts. Detailed studies for the optimization and standardization of parameters for the efficient detection and quantification are in progress.

Patents and IP Status:

IN Provisional patent filed

Icosahedral DNA nanocapsules

Invention ID: CMP-012

The Novel Technology:

The present disclosure relates to encapsulation of functional biomolecules inside icosahedral DNA capsules for *in vivo* delivery. The present disclosure also discloses the entrapment of a functional biomolecules like FITC dextran within the cavity of a DNA polyhedron without any molecular recognition or chemical conjugation between host (DNA icosahedron) and cargo (FITC Dextran). This DNA polyhedron is structurally well defined and shows high encapsulation efficiency.

Applications:

Various functional molecules can be encapsulated like therapeutics and high performance imaging devices like quantum dots. We can target these polyhedra to various sites in living organisms by changing the surface properties of DNA by conjugating it to various tags like folate, etc. These structures can be used as containers to study the functional behavior of encapsulated molecules in confined environments. They can be used as target specific, delivery agents for functional drugs where the drug release can be spatially and temporally controlled *in vivo*. Various functional molecules can also be precisely positioned on the surface of DNA icosahedron. This will have applications in various cell biological problems where controlling the receptor clustering is a challenge in itself.

Advantages of the Technology:

The current state of the art in the encapsulation involves the use of various synthetic molecules and biomolecules as encapsulating agents. These can be broadly classified as (a) structurally well defined and (b) structurally less defined. This method is technically superior to scaffolds of class (a) because (i) it is not limited to molecules that need to undergo molecular recognition with the host scaffold. This affords the following advantages: (i) Larger varieties of molecules may be encapsulated provided they have a size compatibility with the polyhedron. (ii) The size of the polyhedron can also be easily altered to encapsulate differently sized molecules. (iii) Guest molecules do not need to undergo a chemical reaction for encapsulation. This method is technically superior to scaffolds of class (b) because the DNA scaffold is amenable to site specific chemical modifications using multiple orthogonal chemistries. This affords the following advantages: (i) the ability to uniformly functionalize DNA polyhedra in a precisely tunable manner, with multiple tags in bulk. (ii) greater homogeneity of functionalized DNA polyhedra carrying cargo internally, and carrying surface displayed tags for targeting, ensuring minimal batch-to-batch variation.

Other technologies/products in the space:

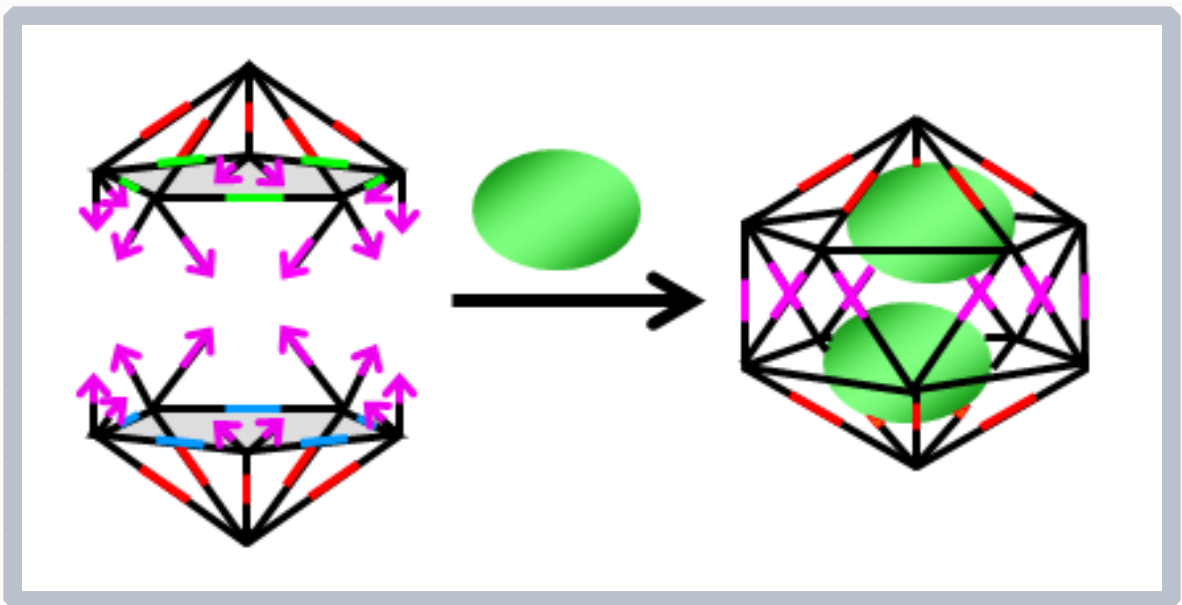
- synthetic hosts like cyclodextrins, crown ethers, cryptands, zeolites, etc
- less structurally defined capsules such as liposomes, PLGA microspheres, protein capsules, etc

Business Model:

Early-stage technology with proof of concept showing the entrapment of a functional biomolecule like FITC dextran within the cavity of a DNA polyhedron without any molecular recognition or chemical conjugation between host (DNA icosahedron) and cargo (FITC Dextran). This DNA polyhedron is structurally well defined and shows high encapsulation efficiency.

Patents and IP Status:

IN Provisional Patent filed



An extract of *Aegle marmelos* fruit

Invention ID: CMP-009

The Novel Technology:

An extract of *Aegle marmelos* (Bael) fruit with cytotoxic effect against *Mycobacterium tuberculosis*

Applications:

The fruits of *Aegle marmelos* were extracted with different solvents and the extracts were screened for their in vitro activity by resazurin microplate assay (REMA). The hexane extract which showed activity against *M. tuberculosis* H37Rv was fractionated further using column chromatography. Activity-guided fractionation of the extract yielded a pure compound with anti-TB activity. By IR, NMR and mass spectral analyses the compound was identified as a naphthoquinone derivative. By REMA the MIC of the compound on *M. tuberculosis* H37Rv was found to be less than 10 µg/ml.

Advantages of the Technology:

Naturally-occurring extract thus easier to obtain than synthesising a synthetic compound

The technology provides the opportunity to develop a novel drug from characterized compounds in the Bael fruit extract to treat TB infections

Other technologies/products in the space:

There are competing drugs in the market which include:

- Ethambutol
- Isoniazid
- pyrazinamide
- rifampicin
- Streptomycin

Business Model:

Early-stage technology. Proof-of-concept demonstrated that hexane extract showed activity against *M. tuberculosis* H37Rv. Activity-guided fractionation of the extract yielded a pure compound with anti-TB activity. By IR, NMR and mass spectral analyses the compound was identified as a naphthoquinone derivative.

Patents and IP Status:

IN Complete Patent filed

Wrightia tinctoria leaf extracts to treat cancer

Invention ID: CMP-010

Abstract:

The present invention provides extracts having potential anticancer activity and the process of preparing the extracts from the plant, *Wrightia tinctoria*. The anticancer activity of the extracts of *W. tinctoria* showed maximum cytotoxicity against skin cancer as well as substantial cytotoxicity towards cervical and lung cancer cell lines

Applications:

It may be used as an effective medicine with minimal side effect and can be brought to the market as a very potential chemotherapeutic drug against skin cancer in particular. Its effectiveness against cervical and lung cancer lines further demonstrates a possible use as a chemotherapeutic drug.

Advantages of the Technology:

Activity against various cancer cell types indicates a broad specificity
The technology provides the opportunity to develop a novel drug from characterized compounds *Wrightia tinctoria* extract to treat skin, lung and cervical cancer

Other technologies/products in the space:

There are competing drugs which include:

- Mechlorethamine
- Cyclophosphamide
- Chlorambucil
- Ifosfamide
- Actinomycin

Business Model:

Early-stage technology. It has been shown that the leaf extract of *Wrightia tinctoria* has potential anticancer properties. Its effectiveness against cervical and lung cancer lines further demonstrates a possible use as a chemotherapeutic drug.

Patents and IP Status:

IN Complete Patent filed

A novel ligand-free nucleic acid assembly delivery method

Invention ID: CMP-014

The Novel Technology:

A novel technology based on label free endocytic delivery of DNA sensors to map spatiotemporal dynamics of small diffusible molecules within living biological systems. These molecules would include, but are not limited to ions, chemical messengers, small organic molecules, second messengers, hormones, as well as metabolites, enzymes, neurotransmitters, proteins, cyclic nucleotides, lipids, phospholipases, biological cofactors, drugs, antibiotics, nucleic acids and their derivatives.

Applications:

The current technology can be used in many ways:

- a) As a high precision chemical sensor
- b) Intracellular delivery agent.
- c) *In vivo* targeting agent.
- d) Dynamics of diffusible small molecules during cell function.
- e) Immunoassays and imaging assays against a specific DNA sequence.

Advantages of the Technology:

Construction of the sensor is easy, as one can just anneal two DNA strand to make a working sensor for any pathway whereas other method like BAC dextran which is a chloride sensor needs conjugation and purification to a number of ligands in order to study multiple pathways.

As this technology use FRET/ratiometric fluorescence as a readout, one can engineer different FRET pair positioned in the different DNA strands to optimize sensitivity and efficiency which is not possible for protein based sensors such as EPAC where the positioning and orientation of fluorescent proteins are prefixed.

This method is superior to other methods as it can precisely localize functional DNA-nanostructures in cellulo and *in vivo* by simply incorporating an artificial DNA-protein pair of an 8 bp sequence and recombinant antibody

This method is generalizable to the chemical diversity of sensing of possible by both DNA and RNA scaffolds as aptamers are readily available against a wide variety of targets such as metabolites, drugs and their derivatives, amino acids, nucleotides and its derivatives, biological cofactors, antibiotics, vitamins, proteins, small peptides, toxins, lipids, growth factors, hormones, enzymes e.t.c..

Further, any small-molecule or ion sensitive dyes could be used for sensing by simple chemical functionalization of the DNA scaffold.

We describe a molecular technology that delivers and trafficks a DNA assembly. The DNA assembly can be modified to incorporate any DNA aptamer or molecular DNA device or be functionalized with small-molecule sensitive dyes, to enable visualization of the former along the chosen trafficking pathway.

Transfection of the chimera and incorporation of the 'handle' domain onto any DNA sequence can send virtually any DNA assembly *in cellulo* or *in vivo* to perform its designated task.

Advantages to the Licensee - Opportunity to develop and optimize a novel targeted delivery method to delivery molecules to their specific intracellular locations or sites of action in a cell.

Other technologies/products in the space:

- Receptor mediated intracellular delivery methods
- Aptamer-based endocytosis for delivery
- Peptide-based delivery methods
- Cationic lipid-based delivery methods

Business Model:

Early-stage technology with proof of concept showing the targeted delivery of nucleic acid-based pH sensor to map the endocytic pathway in HeLa cells.

Patents and IP Status:

IN Provisional Patent filed

FRET based pH Sensor using nucleic acid assemblies

Invention ID: CMP-018

The Novel Technology:

This technology involves the construction of a DNA nanomachine triggered by protons, called the I switch, that functions as a FRET-based pH sensor inside living cells. It is an efficient reporter of pH from 5.5 to 7, with an unprecedented dynamic range between pH 5.8 -7, comparing favourably with all other molecular scaffolds for pH sensing.

Applications:

It can be used as a high performance reporter of spatio-temporal pH changes associated with biological processes that occur on longer time scales such as pH variations associated with:

- viral infections,
- phagocytosis
- chemotaxis
- apoptosis and defective acidification in tumor cells

It can also be used to track synaptic vesicles and endocytic traffic in cells and living organisms

Also, nucleic acid or protein tags can be attached to the sensor to target the sensor to particular cell types, sites within a cell or organelles.

Advantages of the Technology:

- The byproducts of a complete cycle for the DNA Sensor are water and salt, that are non-toxic
- Since it is a FRET based, it is equally bright at both physiological and acidic pH, photostable and offers the advantages of a ratiometric probe.
- It can be used to simultaneously follow multiple proteins with each protein bearing a sensor with a distinct FRET pair, thus positioning it as a powerful probe to study crosstalk in complex intracellular sorting or trafficking events.
- It also compares favourably with other molecular scaffolds used to measure pH 5-7 inside living cells,

Other technologies/products in the space:

- GFP-based or small molecule pH probes

Business Model: The technology is at an early stage of development with the sensor having been validated *in vitro*

Patents and IP Status:

US Patent Application filed

The A-motif: A pH trigger for hybridization of DNA strands

Invention ID: CMP-019

The Novel Technology:

This invention describes a mechanism to hybridize two DNA strands together using a pH trigger. At acidic pH certain Arich sequences can hybridize by forming a parallel duplex. At neutral pH this mode of association is no longer operational and the two strands fall apart. This could be a way to 'switch on and off' DNA base pairing using a pH trigger.

Applications:

- pH switchable 1D, 2D and 3D assemblies can have applications in DNA based computation strategies where they can act as logic gates.
- 3D DNA polyhedra are promising as targettable drug delivery agents
- A-motif based nanomachines can be used to measure pH in late endosomes or lysosomes
- This technology can be used for designing novel biosensors

Advantages of the Technology:

- Highly stable
- Very fast switching mechanism in response to pH (in milliseconds)

Other technologies/products in the space:

- Several devices have been developed based on B-DNA assemblies employing differential hybridization of complementary strands, metal ions and protons
- GFP-based or small molecule pH probes

Business Model: The technology has been demonstrated in the lab wherein experiments such as native PAGE, 2D NMR, circular dichroism (CD) and fluorescence spectroscopy, have been used to characterize the two different pH dependent forms of poly dA helices.

Patents and IP Status:

US Patent Application filed

Modular assembly of novel icosahedral DNA nanocapsules with encapsulating ability

Invention ID: CMP-020

The Novel Technology:

The construction of DNA polyhedral assemblies was done by step-wise modular assembly. The strategy resulted in the most complex DNA-based platonic solid structure, an icosahedral assembly. Icosahedra have 20 triangular faces 30 edges and 12 vertices and all of them being congruent. These DNA icosahedral 'nanocapsules' were used to successfully encapsulate gold nanoparticles, demonstrating that the modular assembly strategy is functional.

Applications:

- Drug / Bioactive molecule delivery by encapsulation into DNA nanocages
- The creation of DNA-protein complexes to mimic viruses and exploit viral entry pathways into cells for delivery of proteins and/or nucleic acids.
- The use of DNA polyhedra as in research for cellular transfection.
- The use of DNA nanocages as organizational scaffolds and nanoreactors for chemical reactions.

Advantages of the Technology:

- The DNA nanocapsules described here are resistant to nuclease digestion, proving that they are completely ligated and do not have exposed ends.
- These DNA nanocapsules have the ability to encapsulate gold nanoparticles, proving that they are functional and can be used for encapsulating other relevant molecules such as drugs, peptides, proteins or nucleic acids.
- The invention described here includes a chemical ligation step using N-cyanoimidazole, conferring stability on the DNA icosahedral nanocapsules.
- Once entrapped, as it is a size based entrapment, the contents cannot leak out of the DNA shell, unlike the leaky encapsulation seen in liposomes.

Other technologies/products in the space:

- Liposomes
- Polymeric nanocapsules

Business Model: The technology is at an early stage with proof-of-concept having been demonstrated using gold particles and encapsulating these gold particles with the DNA icosahedral structure

Patents and IP Status:

US Patent Application filed

The use of inositol 1,4,5 triphosphate receptor mutants in Drosophila for screening small molecules

Invention ID: CMP-021

The Novel Technology:

The present technology provides a cell-based assay for identifying a compound that modulates store-operated, intracellular calcium levels in a cell that expresses a mutated inositol 1,4,5-trisphosphate receptor (itpr) gene. An itpr cell mutant cell of the present technology has abnormal levels of store operated, intracellular ionic calcium.

Applications:

- screening of drugs which can alter intracellular Ca²⁺ levels
- Drugs identified via screening could be of therapeutic value in diseases where deranged intracellular Ca²⁺ signaling has been implicated as causative such as Alzheimer's, Huntington's and Spinocerebellar ataxias and certain metabolic diseases like diabetes and cardiovascular conditions.

Advantages of the Technology:

There are several characteristics of mutant itpr cells that provide for a useful model system including, but not limited to

- a) the cells have a compromised calcium ion release upon stimulation, and
- b) the abnormal or non-wild-type calcium store and compromised calcium release characteristics are restored or rescued upon expression of an Orai gene

The technology provides the opportunity to further develop and market a cell-based assay for identification of potential drug molecules that modulate intracellular Calcium ion concentrations and thus rapidly screen for potential drug candidates for therapeutic uses against diseases where deranged intracellular Ca²⁺ signaling has been implicated as causative

Other technologies/products in the space:

- Microarray screening platforms
- FRET-based sensing/screening methods
- Flux Assays
- Fluorescent and visible light microscopy techniques in organisms to look for phenotype changes in response to stimuli

Business Model: The technology is currently at an early stage with proof of concept demonstrated in a laboratory environment

Patents and IP Status:

US Patent Application filed

A Microfluidic Flow analyzer

Invention ID: CMP-015

The Novel Technology:

The invention is a miniature flow analyzer combining principles of optics, flow cytometry, and microfluidic device fabrication to allow rapid cell analysis and quantification. After minimal preparation, the sample flows through a microfluidic device in which an LED laser detects the presence of CD4 cells. Data is collected and processed on a small electronics board. The device gives the user a clear, concrete measure of the level of CD4 cells in the patient. The device fits on a small table or lab bench, and is made of low-cost materials such as polydimethylsiloxane (PDMS).

Applications:

The current technology has applications in:

- a) HIV detection
- b) cell culture assays,
- c) water contamination detection,
- d) blood counts
- e) oncological applications.

Advantages of the Technology:

Advantages of the present technology include:

- a) Qualitative and Quantitative technology
- b) Lower Cost
- c) Easier Portability
- d) Lower volume of samples required low
- e) Ease of use compared to conventional flow analyzers
- f) Ease of maintenance compared to conventional flow analyzers
- g) Ease of modification and upgradability

The novel technology would also drastically lower the infrastructure cost for establishment of HIV screening centres around the world. In turn, it would provide governments with the incentive to support the establishment of new HIV screening centres. The technology due to its portability, would also allow accurate quantification of cell counts at point-of-care locations, particularly in rural areas.

The technology provides the opportunity to further develop and market a novel, miniature flow analyzer which provides significant advantages over conventional methods of cell counting and analysis

Other technologies/products in the space:

- a) Standard flow cytometers which are currently used to detect HIV via CD4 cell counts,
- b) ELIZA that is used to detect the presence of HIV

Business Model:

The technology is currently at an early stage of development. A basic proof-of-concept has been developed, microfluidic component fabrication has been completed and the device is currently being optimized to be able to differentiate between particles detected. The concept, prototype construction and methodologies for development are technically sound.

For this technology, we have received a Biotechnology Industry Partnership Programme (BIPP) Grant in-aid from Department of Biotechnology, Government of India in the category of Affordable Healthcare Technologies and Products,

Patents and IP Status:

IN Provisional Patent filed