

OBJ Limited

Leaders in the development of magnetic and magnetic micro-array drug delivery technologies



Partnering the development of next generation products in

**Pharmaceutical, cosmetic, consumer healthcare
and surface hygiene applications**

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About OBJ

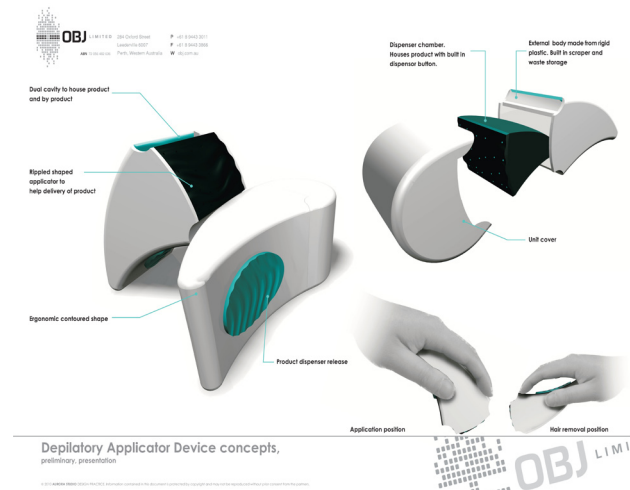
OBJ is the leading developer of magnetic micro-array drug delivery and product enhancement technologies.

OBJ has over 100 years combined expertise in the Pharmaceutical and FMCG sectors, so OBJ understands the business needs of its partners.

OBJ partners companies, both large and small, in the design and development of next generation products using physical science rather than chemistry to provide new levels of product performance without the cost of reformulation or new ingredient approvals.

Systemic Transdermal
Local Transdermal
Dermatological
Skincare
Oral Health
Haircare
Fabric care
Surface Hygiene

OBJ's drug delivery technologies provide benefits in consumer healthcare, homecare and surface hygiene applications as well as in pharmaceutical products



OBJ offers a portfolio of proprietary and patented technologies and supports partners with IP protected market exclusivity, expertise in magnetic array design, feasibility, efficacy and claims testing, engineering and production.

***Product performance enhancement through
the application of physical rather than chemical science***

OBJ provides partnering and design expertise in:

- Transdermal Drug Delivery
- Cosmetic & Therapeutic Skincare
- Oral Health, Haircare and Deo-actives
- High Penetration Surface Care & Hygiene
- Fabric & Carpet Cleaning



Technology

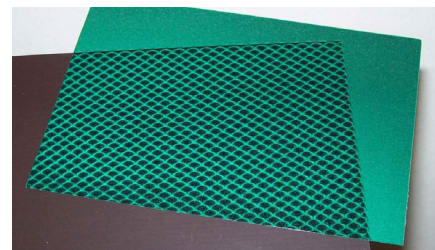


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TECHNOLOGY PLATFORMS

OBJ has developed a platform of patent protected physical enhancement technologies based on low-cost magnetic micro-arrays that influence the movement and penetration of drugs, active ingredients and formulations at the molecular level.

When a magnetic micro-array is correctly matched to a product's atomic structure and physical properties it provides a low cost, powerful and chemistry-free method of enhancing product performance.



Indicator film shows the complexity of micro-array fields used to mobilise complex molecules such as Peptides

SCIENCE BEHIND THE TECHNOLOGY

OBJ harnesses the physical sciences as a new tool to enhance drug delivery and product performance. OBJ uses complex 3-D micro-array and moving magnetic fields to change rates of diffusion independent of concentration and to alter barrier function, wettability and targeting without the need for new chemistry.

OBJ exploits the reluctance of molecules with paired electrons to move across a magnetic field and combines this with the ability of a moving field to alter surface charges and wettability to create a new

MODE OF ACTION

OBJ is the first company to take these physical capabilities and integrate them into low cost micro-array film technology that utilises:

- ***Diamagnetic Repulsion***
to control the rate and depth of penetration of active ingredient molecules
- ***Induced-charge Permeation***
to manage wettability, permeability and to focus the delivery of ingredients to specific targets, such as follicles or to certain specific depths
- ***Energy Redirection***
to capture the motion of normal consumer behavior and redirect that as an energy source for enhanced delivery of target active ingredients

TECHNOLOGY VALIDATION

OBJ's technologies continue to be validated by academic, commercial partners and leading CRO's in Australia, USA, UK and Europe.

While OBJ remains at the cutting edge of technological innovation in drug delivery and the integration of those technologies into pharmaceutical as well as consumer products, it continues to build scientific credibility with partners and across the wider scientific community.

OBJ's technologies have been independently tested and evaluated by independent laboratories, Universities and Contract Research Organisations. Please see Data Library Section for detail and downloadable files.



Technology

Using the Technology



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PRODUCT PLATFORMS

OBJ currently offers three separate technology platforms to suit a board range of medical and commercial needs.

EM-patch

a film based micro-array technology ideal for patches, masks, dressings and other topical applications. The magnetic micro-array film replaces the traditional plastic backing layer imparting new levels of product performance with minimal cost impact.



Field in Motion (FIM)

a magnetic array for use in brushes, applicators and devices that are moved by the consumer as part of normal usage behaviour. The moving magnetic fields generate energy which is redirected to enhance product performance. Well suited to brushes, scrubs, wipes, applicators and various consumer manipulation devices.



Dermaportation

a precision delivery system for repeat or multi-formulation delivery applications. Well suited to many professional and homecare applications where repeat delivery of consumables or the efficient targeting of active ingredients is beneficial.

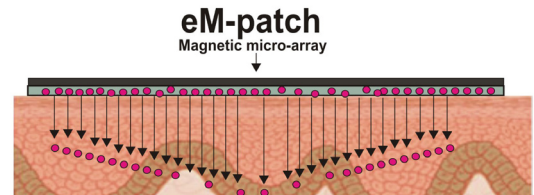
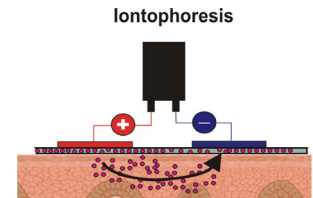


KEY TECHNOLOGY CAPABILITIES

- **Economics**
 - Low cost, long shelf-life, single use or re-usable
 - Opportunity for reduced active ingredient levels
 - Limited regulatory impact
 - 100% active surface
- **Adaptable Format**
 - Drug Patches
 - Strips and Masks
 - Applicators and Devices
- **Drug and Ingredient Compatibility**
 - Lipophilic and hydrophilic molecules
 - Charged and uncharged molecules
 - Wide range of molecular weights
 - Multiple actives and complex formulations
- **Engineered Delivery Profiles**
 - Release and penetration profiling
 - Targeted delivery profile (follicular delivery)
- **Intellectual Property**
 - Patent protected platforms
 - Market exclusivity

MAGNETIC DELIVERY IS DIFFERENT

Magnetic delivery repulses drug molecules so they move vertically into the skin rather than between electrodes. As a result depth of penetration can be influenced by providing micro-arrays with specific flux gradients.

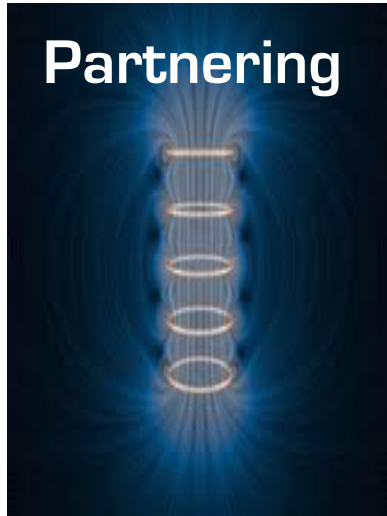


Magnetic delivery acts on a molecule's electron orbits, not its charge, so work independently of molecular weight, charge state or lipophilicity.

Magnetic delivery does not porate or damage barrier function, but alters surface charge and wettability.

Using the Technology

Partnering



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OBJ operates as an independent technology partner providing magnetic expertise, field selection, Proof of Principal (POP) evaluations through to market exclusively and manufacturing support.

OBJ works closely with partner companies by providing knowledge and expertise in magnetic field design, supports in POC and feasibility testing, technology integration, IP protection, product development and manufacturing support.

Each partnership commences with the design and testing of a custom magnetic micro-array to demonstrate the feasibility of magnetic delivery, to determine the potential gains provided and to establish the new claims landscape.

Every product or formulation represents a unique environment of interacting atomic forces. As a result, there is no “off-the-shelf” micro-array that can show the true potential of magnetic delivery. Even the simplest evaluation requires an specific to the product under evaluations.



OBJ provides technology innovations and partnering expertise from concept through to production

MAGNETIC SUSCEPTIBILITY TESTING SEQUENCE

The complex interactions between magnetic fields and molecules, bio-targets and Formulations are yet to be fully modeled. As a result, it is unwise to use a magnetic field developed for a different molecule with a different atomic structure in studies designed to determine the potential benefits of magnetic delivery.

Three simple steps provide a low risk, accurate and time efficient method of evaluating the potential product benefits of magnetic enhanced delivery for a particular molecule or formulation.

Step 1

CAN WE MOVE YOUR MOLECULES?

OBJ develops and tests an array to see if they can move your molecule compared to passive diffusion in a low cost *in vitro* evaluation.

Step 2

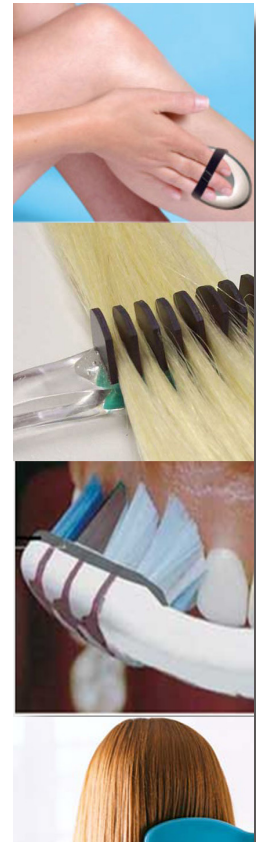
HOW MUCH ENHANCEMENT IS POSSIBLE?

OBJ fine-tunes an array to achieve the best control in the target application using simple *in vitro* methodologies.

Step 3

DOES THIS TRANSLATE TO CONSUMER BENEFIT?

A prototype and product testing phase quantify efficacy and validate the new claims.



Partnering

Data Library



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TEST PROGRAMS

Magnetic enhanced delivery has been broadly tested using a range of methodologies. This is a small sample of OBJ's experience base.

IN VITRO DIFFUSION STUDIES

The following drugs and ingredients have been evaluated for their suitability for magnetic enhanced delivery in University studies using Franz type diffusion cells and excised human epidermis

ALA hydrochloride
Caffeine
Ibuprofen
Prilocaine Hydrochloride
Lidocaine Hydrochloride
β-estradiol
Dipeptide Ala-Trp
Testosterone
Tetracaine Hydrochloride
Diclofenac sodium
Diclofenac diethylammonium salt
Carbamide Peroxide

DOWNSTREAM BIOEFFECTS

The following drugs and ingredients have been evaluated by monitoring of various downstream bioeffects

Benzoyl Peroxide
Carbamide Peroxide
Clobetasol
Chondroitin Sulphate
Diclofenac
DiPeptide
Glucosamine
Hyaluronic Acid
Hydrogen Peroxide
Ibuprofen
Methyl Nicotinate
Nano-particles (gold)
Palmitoyl Pentapeptide-3
Terpenol-4-OL
Thioglycolic acid
Triclosan
Urea

IN VIVO CLINICAL STUDIES

The following drugs were subjected to placebo controlled adn blind efficacy studies by independent Universities.

Clostridial related Vaccine (Glanvac)
Tetracaine (amethocaine)
Urea (cosmetic)

SELECTION OF INDEPENDENT UNIVERSITY AND CRO STUDIES

AzoPharma (USA)	NSAID Patch development and ex vivo efficacy study
Modus Labs (UK)	Oral Health - ex vivo enhanced uptake evaluations
Rivers Diagnostics	In vivo Raman spectrographic evaluation of Diclofenac delivery
Queensland University	Enhanced transdermal delivery of Nano-particles in vivo
Curtin University	Enhanced Di-peptide delivery ex vivo
Murdoch University	In vivo transdermal peptide vaccine study (animal)
Curtin University	Double blind human pilot study into topical Anaesthetic delivery by Dermaportation

RECOMMENDED READING

The following documents are available for download from the OBJ web site at www.obj.com.au

- OBJ's Collaboration Principles
- Safety of OBJ Technologies
- List of Drugs and Active Ingredients tested
- Discussion of Epidermal Pore Formation by Magnetic Fields

Peer reviewed Journal Articles

- Journal of Pharmacy and Pharmacology
- Journal of Pharmaceutical Science
- Biopolymers
- Journal of Chromatography



Contacts

Dr Kevin Hammond - International Partnering Manager - khammond@obj.com.au
Dr Hammond has over 30 years experience with leading pharmaceutical, FMCG and Cosmetic companies where he held responsibilities in directing partnering, licensing and new product innovations for companies such as Reckitt Benckiser, Unilever, PZ Cussons, CB Fleet (US) and GSK. Dr Hammond is a visiting lecturer at London College and a member of the Editorial Board of the International Journal of Cosmetic Science. Dr Hammond is based in the UK and manages OBJ's European base for partnering, evaluation and product development activities.

Jeffrey Edwards – Technical Director - jedwards@obj.com.au
Jeffrey Edwards is Director of Operations and Technical Director and is responsible for scientific and technology developments. Jeffrey Edwards is also responsible for client support and works closely with the Company's International Partnering programs.

Dr Matt McIlldowie - Research Manager - mmcildowie@obj.com.au
Dr McIlldowie is responsible for partnering programs at the technical and study level. Dr McIlldowie holds a PhD in chemistry and has many years of experience in diverse fields such as medicinal/pharmaceutical chemistry, biological chemistry, industrial processes and materials. Dr McIlldowie works closely with Dr Hammond and Jeffrey Edwards in client support and partnering programs.

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