# INVION

## Transforming Photodynamic Therapy: for novel & effective treatments for cancer

**Invion Limited (ASX: IVX)**

# INVION IS DEVELOPING PHOTOSOFT™ TECHNOLOGY, THE NEXT-GENERATION PDT

| | |
|---|---|
| **Lead products** | Advancing Photosoft™ technology - a novel photosensitiser – with new formulations of (IVX- P02) for topical and intravenous use |
| **Compelling data** | IVX-P02 is 15 times more effective in killing cancer cells in *in vitro* tests against ovarian cancer, compared to Photosoft™ Oral |
| **Entering the clinic in 2019** | Multiple human clinical trials commencing in Q1, 2019 in Australia and then further global clinical development managed by Invion's clinical team |
| **Fully funded** | Clinical development fully funded by The Cho Group, the inventor and owner of Photosoft™ technology |
| **Experienced Board and Management** | Strong track record in taking new drugs from clinical development to regulatory approval and to market. Rapid progress made since licensing the technology in 2018 |
| **World-leading SAB and research** | Globally renowned experts in specific cancer fields |
| **Diverse portfolio** | Licensed commercial rights for multiple applications across a range of cancers in Aus/NZ |

# PHOTOSOFT™ TECHNOLOGY ADVANTAGES

How does Photosoft™ Technology differ from existing PDT treatments:

- The compound can be activated using multiple wavelengths, allowing for both diagnostic and therapeutic use
- Water soluble – IVX-P02 compound doesn't accumulate in the body
- Can be administered via various routes – topical and intravenous.
- Demonstrates positive immune response in Phase I clinical trials (compared to established PDT treatments that are immunosuppressive)

INVION™

# INVION TEAM: GLOBAL EXPERTS IN CANCER

# STRONG
# EXPERIENCED LEADERSHIP

## Greg Collier PhD

**CEO and Managing Director**

- 25+yrs experience in clinical drug development, corporate management, strategic planning and implementation across the global biotechnology industry
- Chairman of Phosphagenics Limited (ASX:POH)
- Previous: CEO of ChemGenex (sold to Cephalon for $200M+)
- 150 peer-reviewed publications, 33 patents, Roche Award for Excellence

## Craig Newton

**COO**

- 30+ yrs operational experience in Biotech, Medical Devices and big Pharma.
- Previous senior roles at CSL Limited, Serono UK and Australian biotechs.
- Qualified in Medical Science, Management and Marketing

## Melanie Farris

**CFO & Company Secretary**

- Key experience in complex business activities, including restructure, IPO, M&A and shareholder action; board reporting, board operations and support, financial and compliance reporting
- Bachelor of Communication (Public Relations), and a Graduate Diploma in Applied Corporate Governance

## Thian Chew

**Chairman**

- Managing Partner, Polar Ventures
- Executive Director, Goldman Sachs proprietary investing (New York, Hong Kong), public and private across capital structure
- Director, KPMG Consulting (Singapore, Sydney
- Senior Manager, KPMG (Taipei, Melbourne): Audit and assurance, IT risk management
- Chartered Accountant, MBA/MA Wharton School (Palmer Scholar)

## James Campbell PhD MBA

**Non-executive Director**

- 20+yrs international experience in scientific research, research management, management consulting and venture capital
- CEO of ASX- listed biotechnology company, Patrys Limited (ASX:PAB)
- Former CFO & COO at ChemGenex Pharmaceuticals Dr Campbell has also held research positions at the CNRS and the CSIRO

## Alan Yamashita

**Non-executive Director**

- 16-yrs veteran at Goldman Sachs,
- Managing Director & Head of Asian Capital Markets for Merrill Lynch
- President, CEO and CIO of Search Alternative Investment Limited (SAIL)
- Managing Partner, Polar Ventures
- Executive Advisor of Mizuho Alternative Investments
- MPA Princeton, BA Yale

# MANAGEMENT TEAM
# GLOBAL EXPERTS IN DRUG DEVELOPMENT

### Alexander Bennett
**Technical Advisor**

- 35+ years experience in senior technical and management at Rofin and at ICI.
- Product development, QA and international commercialisation of light source technology.
- Physics degree.

### Louise White
**Manufacturing and Quality Advisor**

- Over 35 years experience in the pharmaceutical industry
- 13 years experience in a sterile vaccine manufacturing company, CSL and over 22 years within SeerPharma.
- Louise has held roles in Virology R & D, Bacterial Vaccines Production, Quality Control and Production Planning.
- Louise is a registered auditor for the Australian Pesticides and Veterinary Manufacturing Authority (APVMA) and current Partner at SeerPharma

### Dr Sebastian Marcuccio
**Chemistry Advisor**

- 15+ years experience in Pharmaceutical and organic chemistry developmental research
- 16+ years of commercial experience in smaller scale molecular based companies (Managing Director and Founder)
- Currently an adjunct Professor at La Trobe University
- PhD in Organic Chemistry - ANU

### Xenia Sango
**Regulatory and Clinical Development**

- Over 25 years as a healthcare executive and independent consultant
- Senior clinical, regulatory and international commercialisation roles at CSL Limited as Senior Director of Influenza Commercial Operations; Director of International Registrations, and Head of Regulatory Affairs.
- Xenia holds a Masters of Science (Chemistry)

# SCIENTIFIC ADVISORS
# LEADING AUTHORITIES IN CANCER AND PDT

### Dr Andrew Stephens
**Scientific Advisory Board member**

- 15+ years experience in novel treatment research and develop
- Founder of the Ovarian Cancer Biomarker Group at the Hudson Institute
- PhD in Biochemistry from Monash and Ovarian Cancer Research Foundation (OCRF) Research Fellow.

### Assoc. Professor Louis Irving
**Scientific Advisory Board member**

- Lung Cancer; Respiratory Physician, Peter MacCallum Cancer Centre,
- Director, Clinical Training, Royal Melbourne Hospital
- Principal fellowships at the University of Melbourne, in Faculty of Medicine, and Department of Physiology
- Clinical, teaching and research interests in lung cancer, advanced bronchoscopy and COPD - has published over 100 scientific papers
- On the Lung Foundation Australia Lung Cancer Committee, the WCMICS lung cancer group and the Scientific Advisory Committee, National Research Centre for Asbestos Related Diseases.

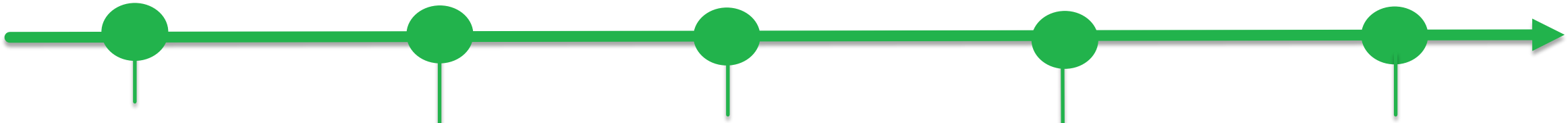
### Assoc. Professor Nathan Lawrentschuk
**Scientific Advisory Board member**

- Urologic Oncologist
- Director of Urogology Research Centre, Epworth
- Urological surgeon and oncologist in the Uro-Oncology Service at the Peter MacCallum Cancer Centre, appointments at The University of Melbourne Department of Surgery and Olivia Newton-John Institute for Cancer Research at the Austin Hospital, Melbourne.
- Member of the Society of Urologic Oncology (the peak North American body for urology cancer surgery)

### Dr Lynda Spelman
**Scientific Advisory Board member**

- 26 years experience in dermatology with special interest in clinical research trials
- conditions, including atopic dermatitis/eczema, chronic plaque psoriasis, palmoplantar psoriasis, hidradenitis suppuritiva, seborrheic keratosis, and superficial and nodular basal cell carcinoma
- Founder and a director of the Queensland Institute of Dermatology,
- Principal Investigator of Veracity Clinical Research
- Honorary Secretary of the Queensland Skin and Cancer Foundation (QSCF) since 2000
- Conducted studies in wide range of dermatological

# 2018
# A YEAR OF RAPID PROGRESS



### MANUFACTURING-AGENT

- Contract manufacturer engaged
- Process developed to generate improved drug IVX-P02
- Stable supply

### MANUFACTURING – LIGHT SOURCE EQUIPMENT

- Collaboration with Chinese manufacturer of LED and laser equipment

### HUDSON RESEARCH COLLOBARATION

- Dr Andrew Stephens appointed to Invion Scientific Advisory Board
- Leading research institute
- Multiple projects underway to advance Photosoft™ technology

### IVX-P02 FORMULATION

- New formulation tested *in vitro* -15x more effective than Photosoft™ Oral in ovarian cancer
- Data presented at ComBio 2018

### SKIN CANCER PROGRAM

- Topical formulation for skin cancer
- Industry experts Formulytica for formulation & vivoPharm for pre-clinical studies

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# INVION PDT
# MECHANISM OF ACTION

# ADVANTAGES OF PHOTOSOFT™ TECHNOLOGY

PDT is a proven, effective cancer therapy. Photosoft™ has been improved since inception

Is inert without light and rapidly clears from cells

Absorbs light in wavelengths to “light up” a tumour (diagnostic) or activate oxygen free radicals that kill cancer cells

*In vivo* tests show that it is selectively taken up by the cancer cells, not normal tissue

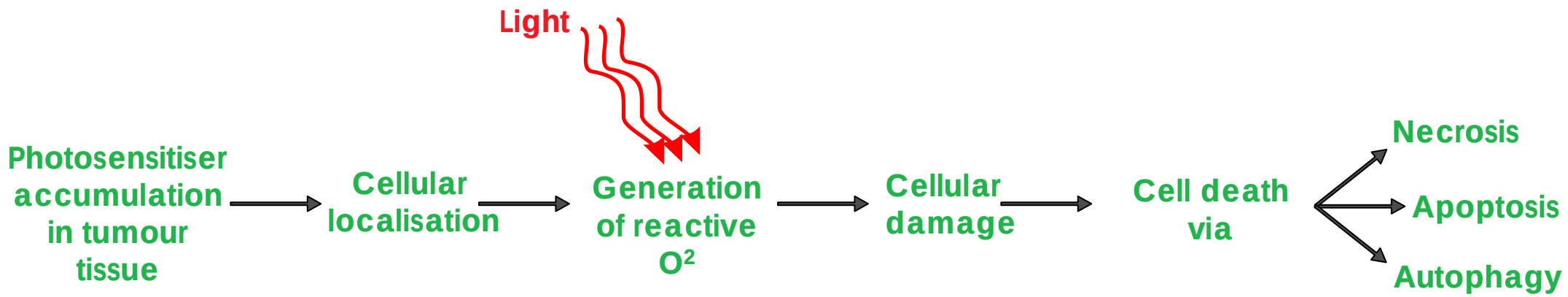
Has advantages in wavelength, solubility and selectivity

More effective at killing cancer cells at lower concentrations. Cell death is not random and is well characterised

# PHOTODYNAMIC THERAPY:
# A NOVEL CANCER TREATMENT

**Photodynamic therapy (PDT)**

- Combines photosensitiser compound with light-induced activation
- Generates reactive oxygen species causing damage to organic molecules
- Direct cell death and induction of inflammatory response




HUDSON INSTITUTE OF MEDICAL RESEARCH

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# NEXT GENERATION PDTs: PHOTOSOFT™ ORAL & IVX-P02

**Photosoft™ Oral**

- Chlorin-e4 based photosensitiser, multiple excitation peaks
- Blue light – strong red fluorescence for lesion visualisation
- Red light – generation of ROS for directed tissue ablation
- Non-toxic and tolerated at high doses

**IVX-P02**

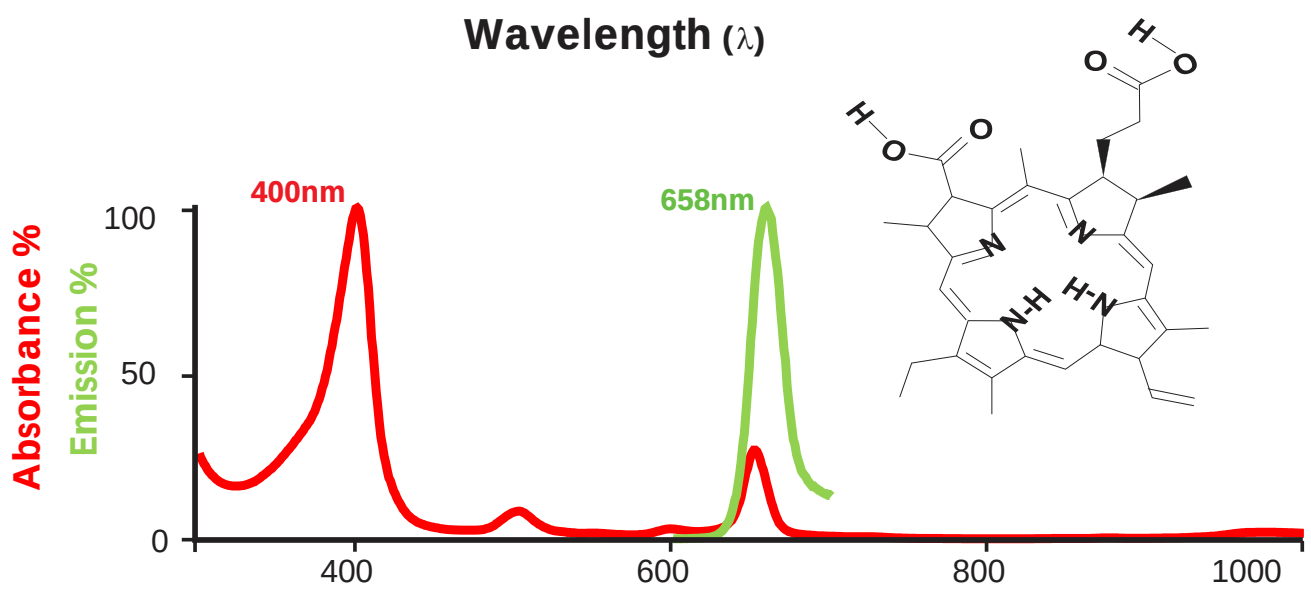
- Next iteration of Photosoft™ technology
- Topical and IV delivery, with enhanced cytotoxicity

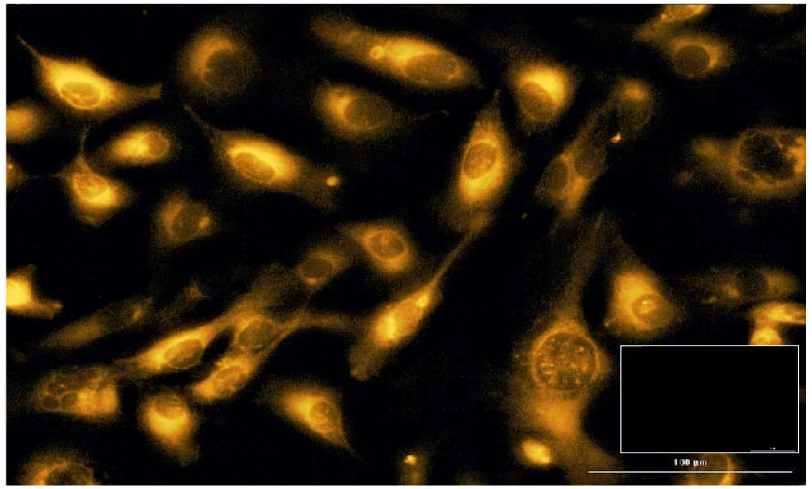
# SPECTRAL CHARACTERISTICS OF PHOTOSOFT™ AND IVX-P02

**Blue light excitation produces red fluorescence for cellular visualisation**

- Excitation maxima at 400nm, with additional peaks at 550 and 650nm
- Single emission peak at 658nm

With this ability to absorb light at two wavelengths Invion's IVX-P02 has multiple indications – When activated with the lower wavelengths IVX-P02 acts as a diagnostic imager, lighting up the tumour. When activated by the second light wavelength IVX-P02 generates the oxygen free radicals that kill the cancerous cells.

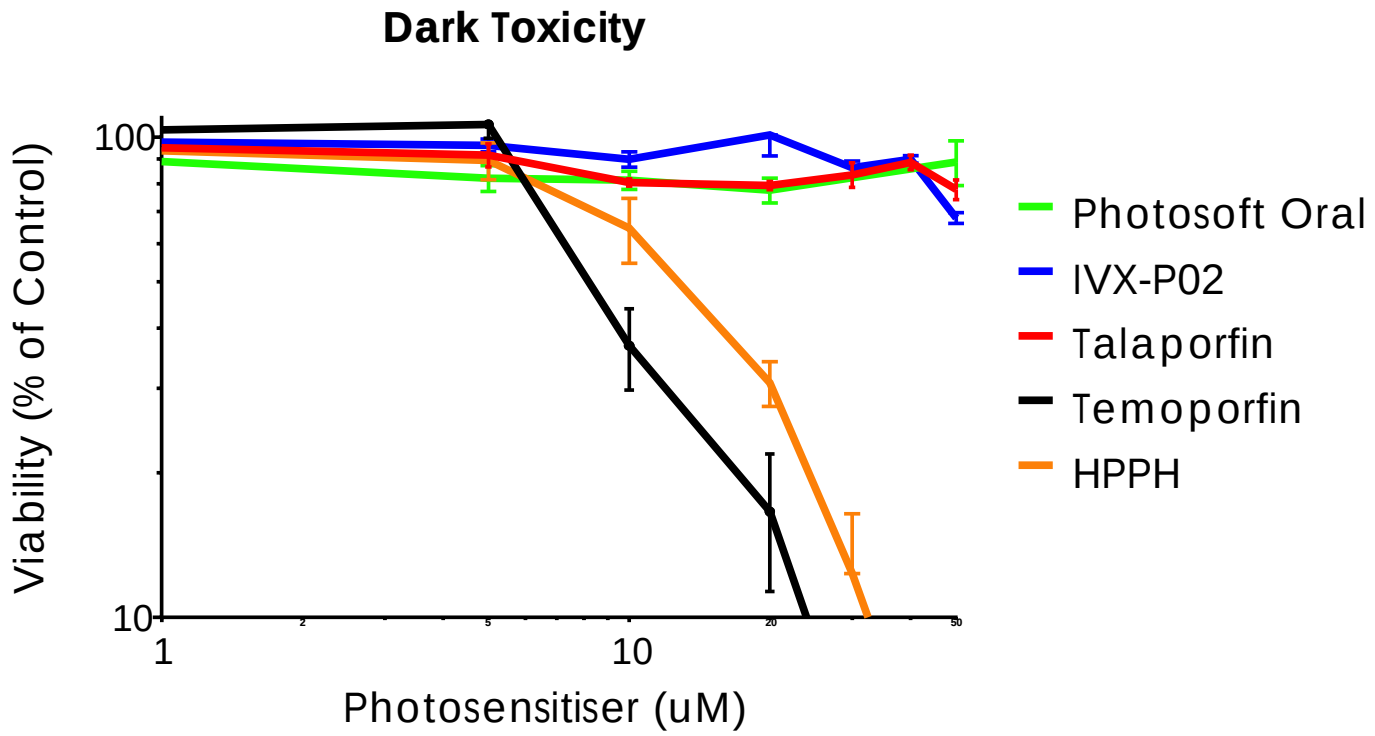


Ovarian cancer cells stained with Photosoft™

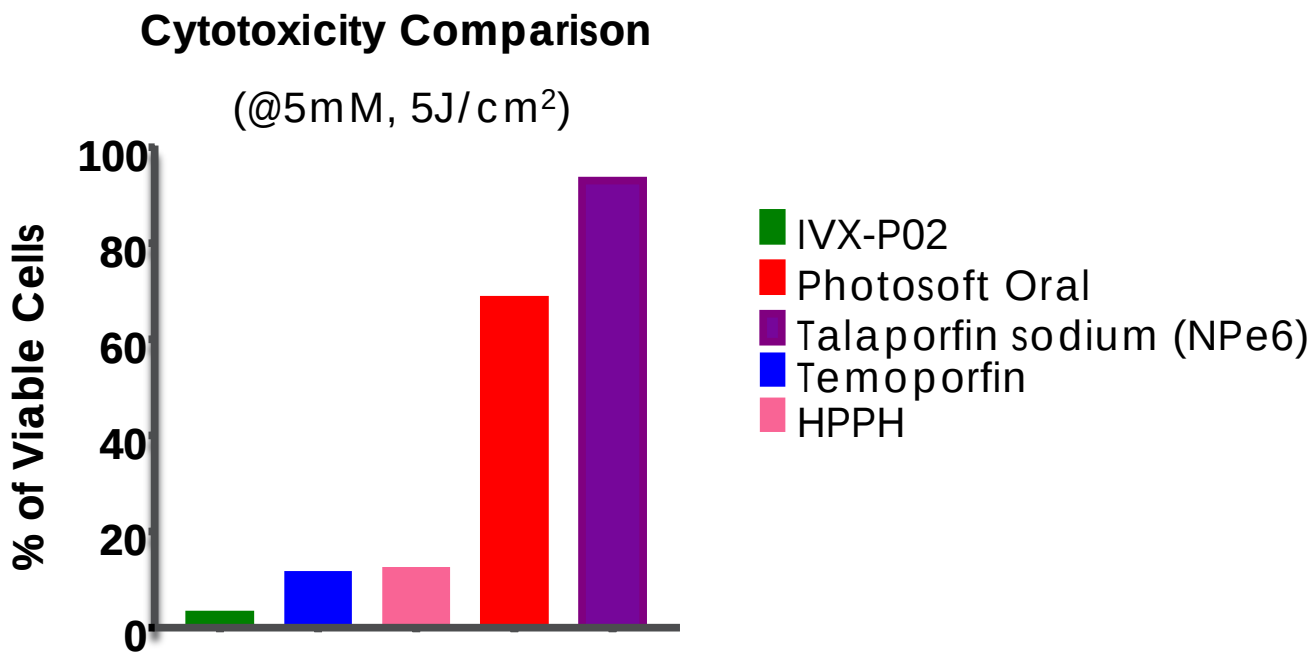
# PHOTOSOFT AND IVX-P02
# NOT ACTIVATED BY AMBIENT LIGHT

- Cancer cells incubated with increasing photosensitiser concentrations for 24hrs
- No evidence of cytotoxicity prior to activation
- The Photosoft™shows significantly lower “dark toxicity” than Temoporfin (Foscan™) and HPPH (Photochlor™) – without light activation the compound is 100% inert



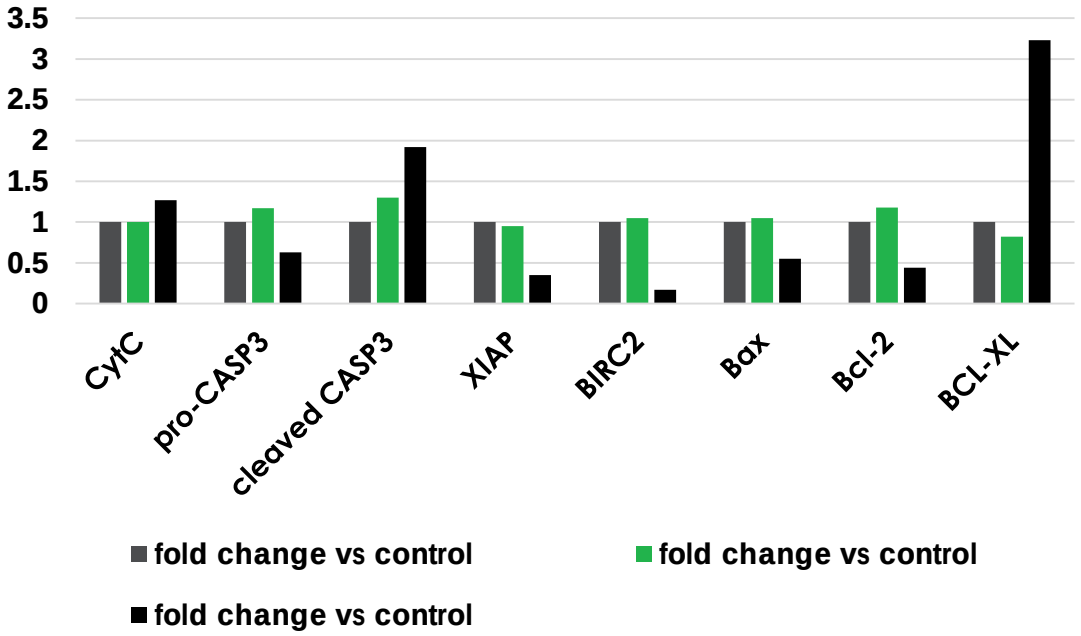
# IVX-P02 CYTOTOXICITY
## SUBSTANTIALLY GREATER THAN OTHER PHOTOSENSITISERS

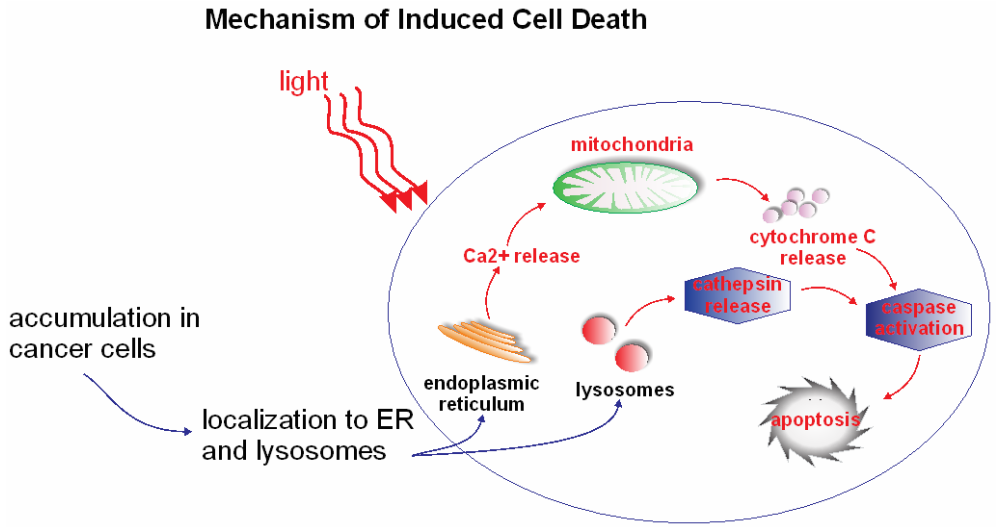
- Cytotoxicity in ovarian cancer cells tested at fixed concentration and total fluence
- Cell death compared between multiple photosensitisers
- IVX-P02 has the greatest cytotoxic effect after activation than any other sensitiser tested – a precise and effective execution of cancer cell



# IVX-P02 INDUCED APOPTOSIS
# VIA ER CALCIUM FLUX AND CASPASE ACTIVATION

- Cell death pathways induced on IVX-P02 activation explored using antibody array
- IVX-P02 treatment resulted in release of cytochrome C, caspase 3 cleavage, and altered abundance of multiple apoptosis-related proteins. Validates that the cell death is not a random occurrence but a consequence of the **cytotoxicity created through the activation of IVX-P02**



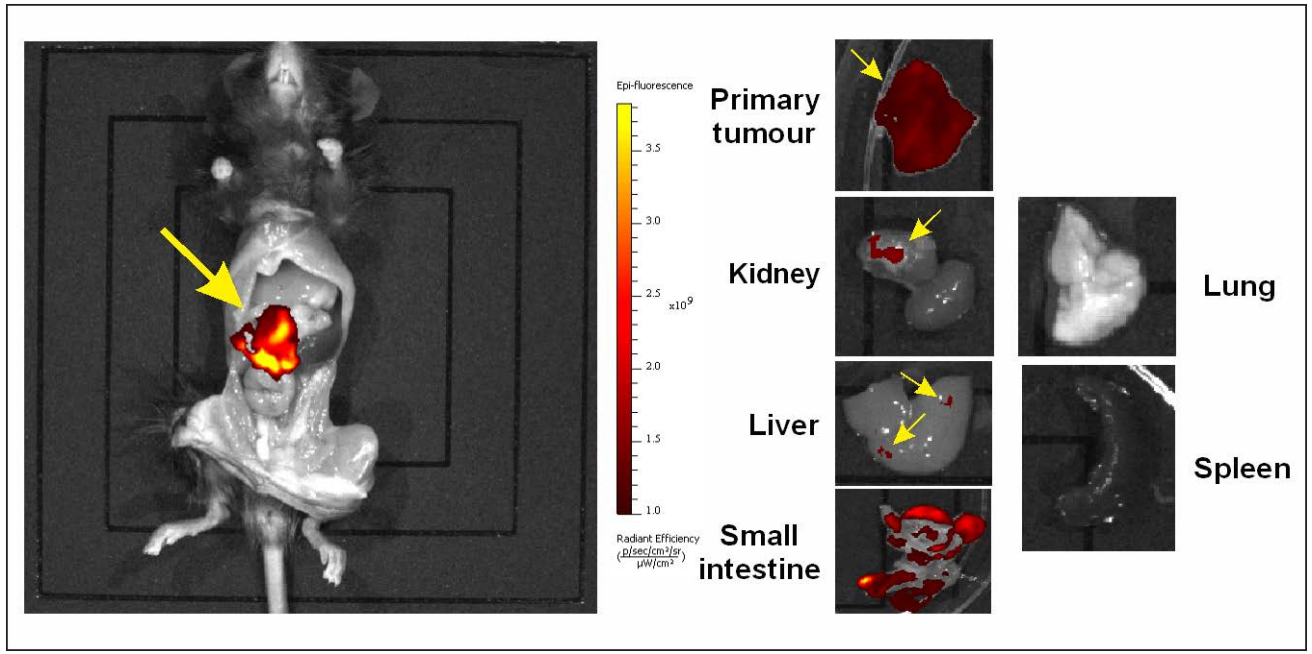

Verified in various assays and panels examined by the Hudson Institute of Medical Research, the above model represents the likely Likely combination of apoptotic and necrotic death induced

# IVX-P02 LOCALISES TO TUMOR TISSUE IN MOUSE MODEL OF OVARIAN CANCER

Mice with advanced ovarian cancer administered IVX-P02 (intraperitoneally).

**Mice trial findings :**

- Clear and specific accumulation in tumour tissue
- Both primary tumour and metastatic lesions detected – the IVX-P02 compound clearly identifies the cancerous tumour tissue
- No localisation to non-tumour tissue detected – the compound is selectively taken up by the tumour cells and **NOT normal tissue**



# INVION'S PRIORITY AREAS OF DEVELOPMENT

# SKIN CANCER PROGRAM
# A POWERFUL NEW TREATMENT OPTION

Invion will be pursuing **superficial BCC (sBCC)** and **Actinic Keratosis (AK).**

**Product Characteristics**

- Therapeutic
- Topical Application
- Gel formulation
- Fast drying
- Incubation Time (up to 24 hours)
- Illumination with light source at 652 nm

**Collaborations established:**

**Formulytica**

- Engaged to develop topical formulation of IVX-P02
- Ready for human clinical trials in 2019

***vivo*Pharm**

- Engaged to undertake pre-clinical studies
- First data expected early 2019

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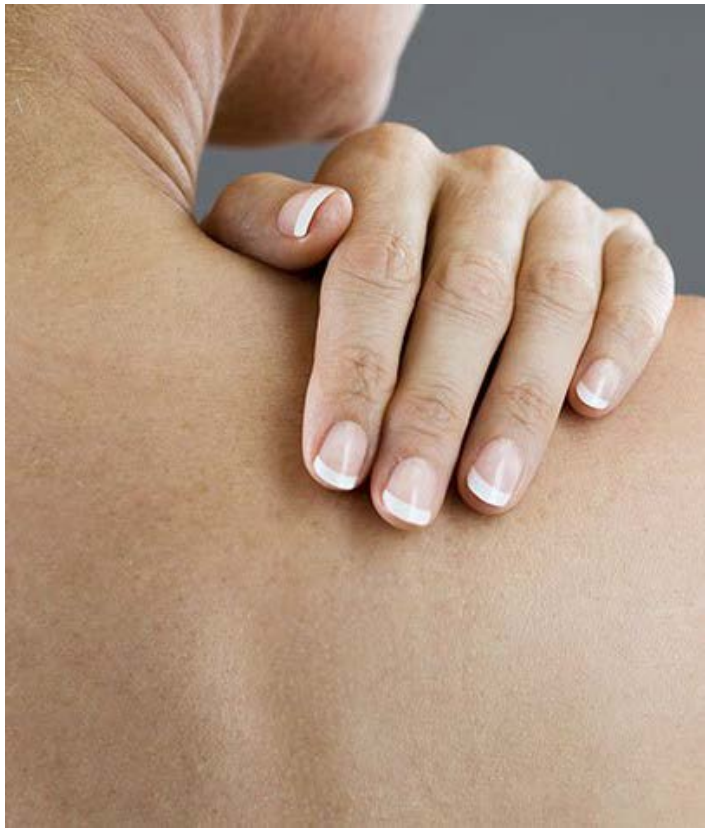
# IVX-SKIN: USING INVION'S TOPICAL PDT PRODUCT

**Using Invion's Topical PDT Product, *IVX-SKIN,* to treat skin cancers**

- Basal Cell Cancer (BCC)
- Actinic Keratosis (pre-cancer)
- Squamous Cell Cancer (SCC)

Skin cancer is the most common cancer worldwide, with over 50 million cases of skin cancer and actinic keratosis (pre-cancer) diagnosed every year



**Current treatments for skin cancer/actinic keratosis not ideal**

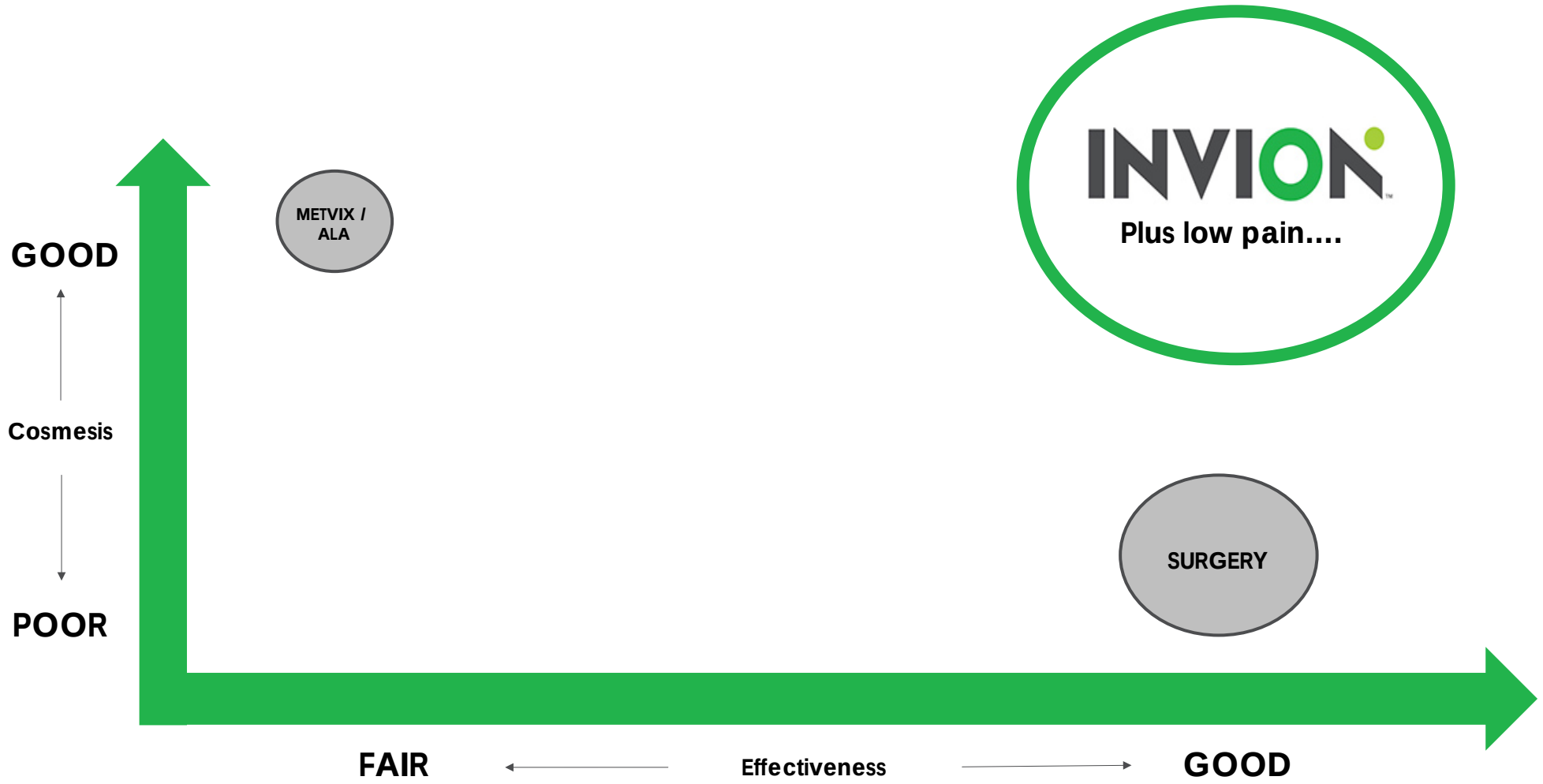
Surgery/cryotherapy

- The standard therapy
- Works well, but cosmetic results are poor, with scarring and discolouration

Current PDT – Metvix/ALA

- Little use
- Cosmetic results are good but doesn't work as well as surgery
- Painful

# FOR SKIN:
# POTENTIAL FOR UNIQUE POSITIONING

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# IVX-SKIN:
# PATH TO SUCCESS AND CLINICAL STUDIES

Invion will optimise the *IVX-SKIN* drug/light combination to build clinical and commercial success

**Strategy:** Target indications where we are differentiated by being less painful (eg vs Metvix) and better than surgery.

**Skin cancer Phase Ib Trial**

- Superficial Basal Cell Cancer (BCC)
- Optimise drug/light combination
- Study efficacy, pain, cosmesis
- Up to 40 patients
- To be undertaken: Q2–Q4 2019

**Phase III Trial: compare Invion vs Metvix and surgery in BCC**

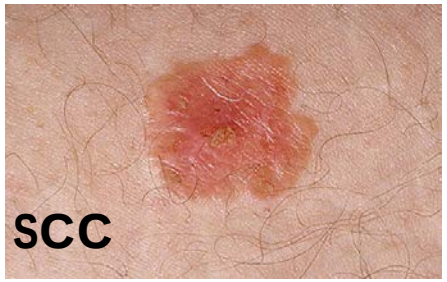
- Use optimised drug/light combination
- Study efficacy, pain, cosmesis
- Up to 100 patients in each arm – aiming for 50 per arm
- Use outcome data to support registration of *IVX-SKIN*
- To be undertaken: Q4 2019–Q1 2020

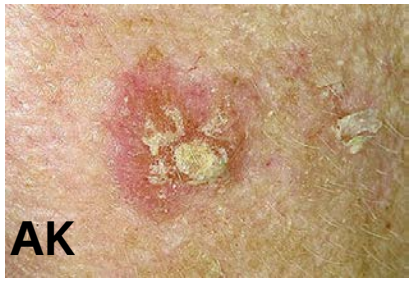
**Phase III Trial: compare Invion vs Metvix and cryotherapy in AK**

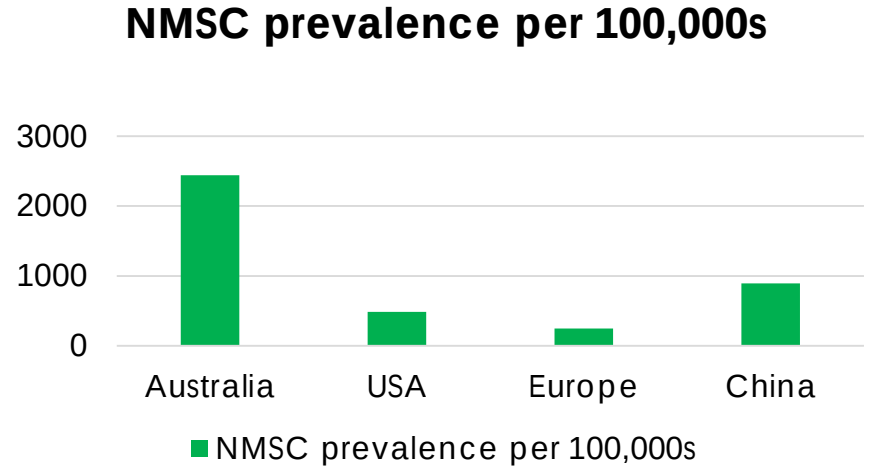
- Use optimised drug/light combination
- Study efficacy, pain, cosmesis
- Up to 100 patients in each arm – aiming for 50 per arm
- Use outcome data to support registration of *IVX-SKIN*
- To be undertaken: Q4 2019–Q1 2020

# IVX-SKIN: NON MELANOMA SKIN CANCER (NMSC) AND ACTINIC KERATOSIS(AK)

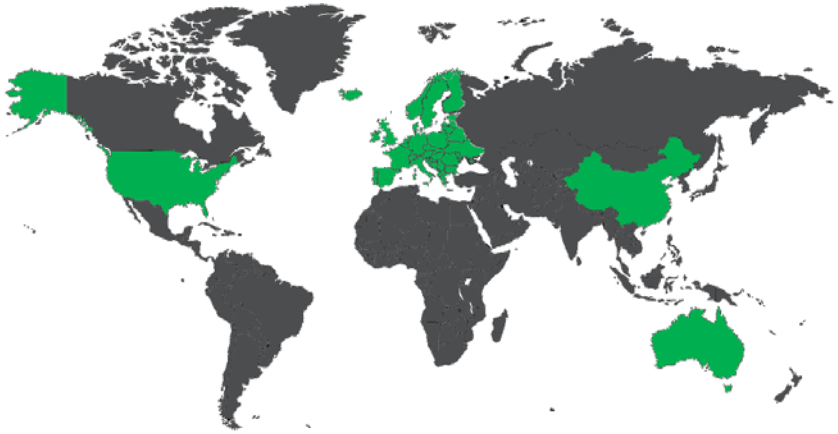
- 99% of skin cancers are non-melanoma.
- BCC accounts for 70% of NMSC with SCC about 25%.
- AK is a common pre-cancerous skin lesion which may progress to SCC. Australia has the highest prevalence of AK ranging between 40-60% of the population.
- NMSC and AK are growing
  - SCC incidence is growing by 3–10% per year
  - BCC incidence rate has risen between 20–80% in the US in last 30 years
  - NSMC: Australia has the highest incidence of NMSC in the world.
  - Australian market for BCC and AK is approx. AUD 703m.
  - AK: Photo Dynamic Therapy accounts for a major revenue share in the actinic keratosis treatment market



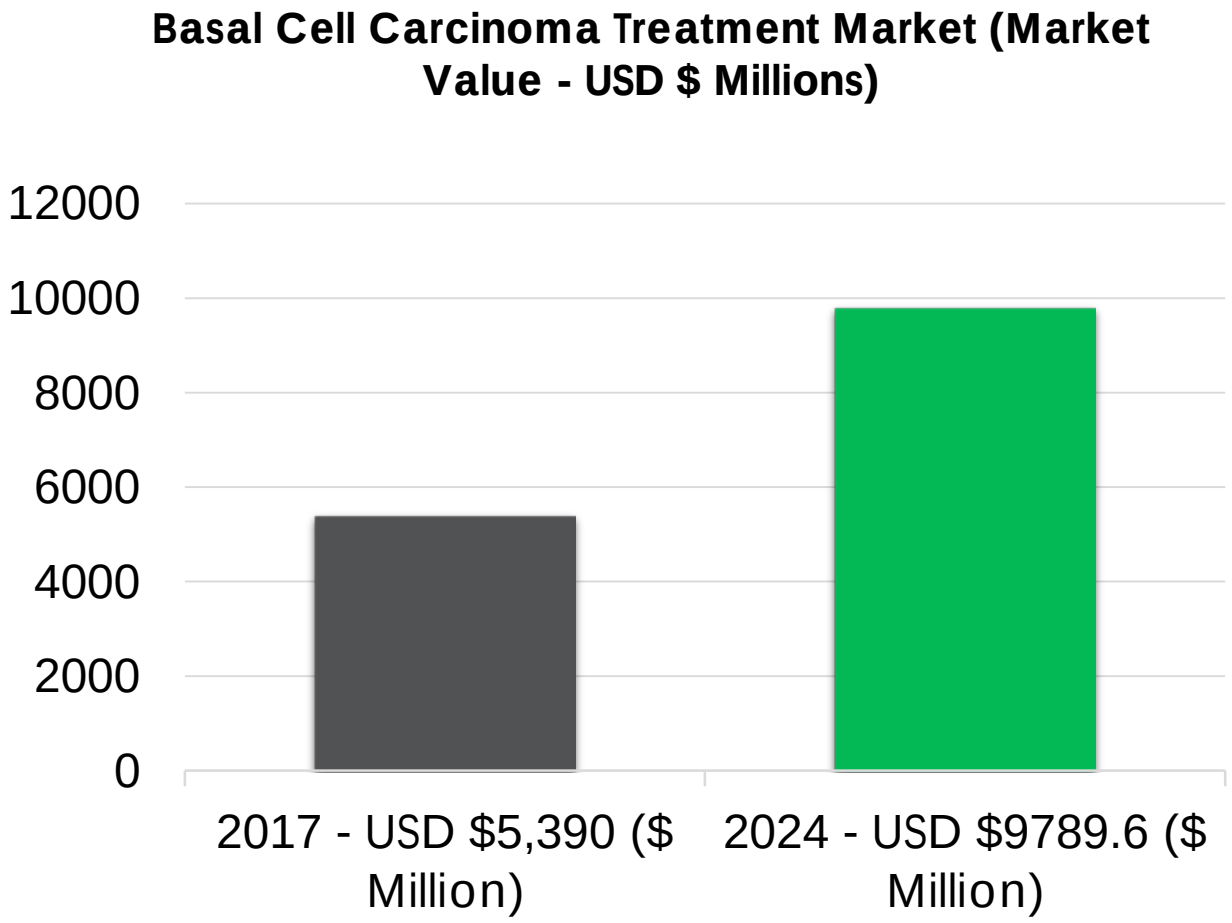




***Over 132m patients in USA, China, Europe and Australia with NMSC or AK***



# IVX-SKIN: NON MELANOMA SKIN CANCER (NMSC) AND ACTINIC KERATOSIS(AK)




"Basal Cell Carcinoma Treatment Market global report'

- Global basal cell carcinoma market was valued approximately USD 5390 million in 2017 and is expected to generate revenue of around USD 9789.6 million by end of 2024
- Market growth expected at a CAGR of around 8.9% between 2018 and 2024.[1]

[1]Zion Market Research has published a new report titled "Basal Cell Carcinoma Treatment Market by Treatment Type (Surgery, Drugs, and Others) and by End-user (Hospitals, Specialty Clinics, and Other End Users): Global Industry Perspective, Comprehensive Analysis, and Forecast, 2017 – 2024" - https://www.zionmarketresearch.com/report/basal-cell-carcinoma-treatment-market

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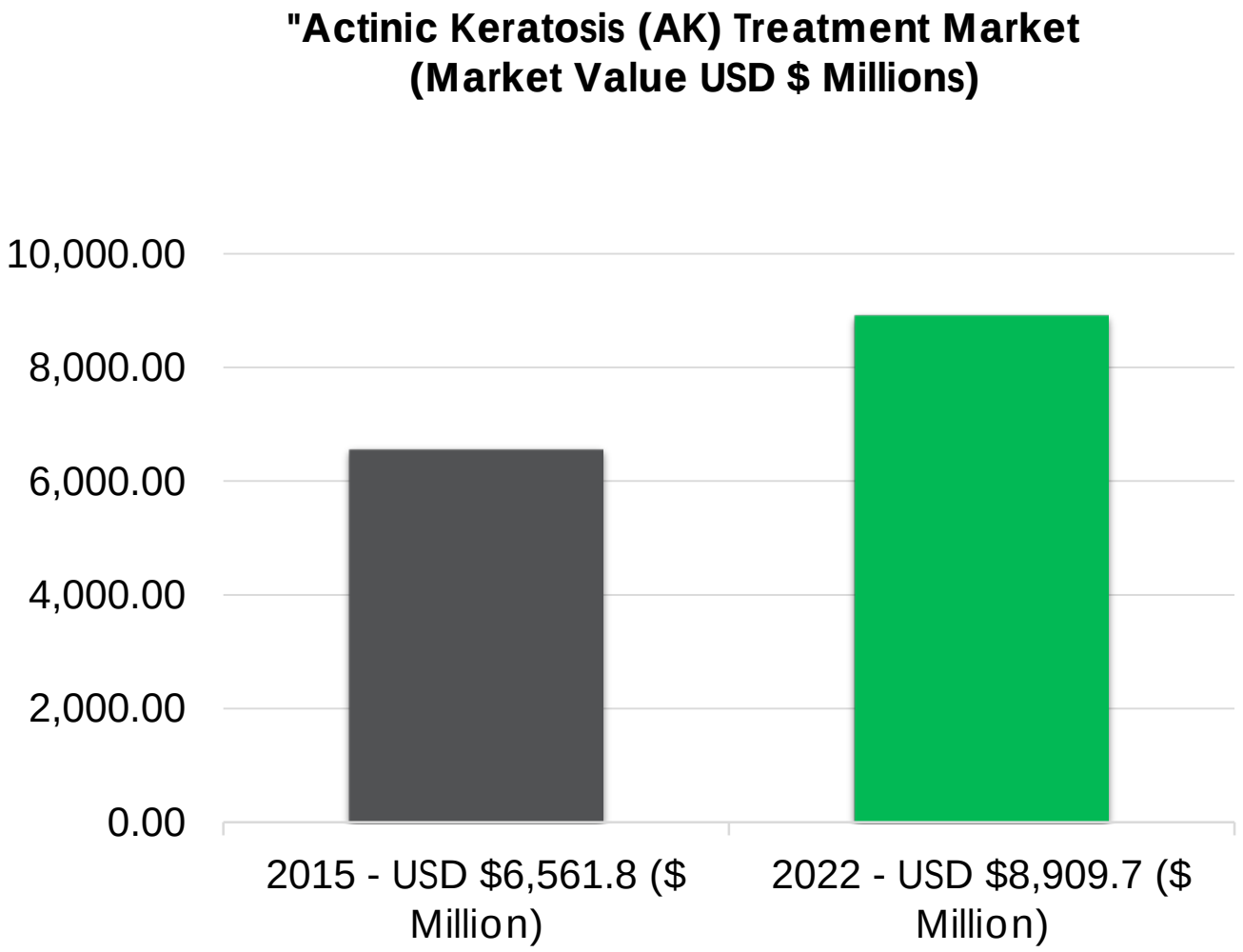



"Actinic Keratosis Market By Treatments Growth, Share, Opportunities & Competitive Analysis, 2016 – 2022":

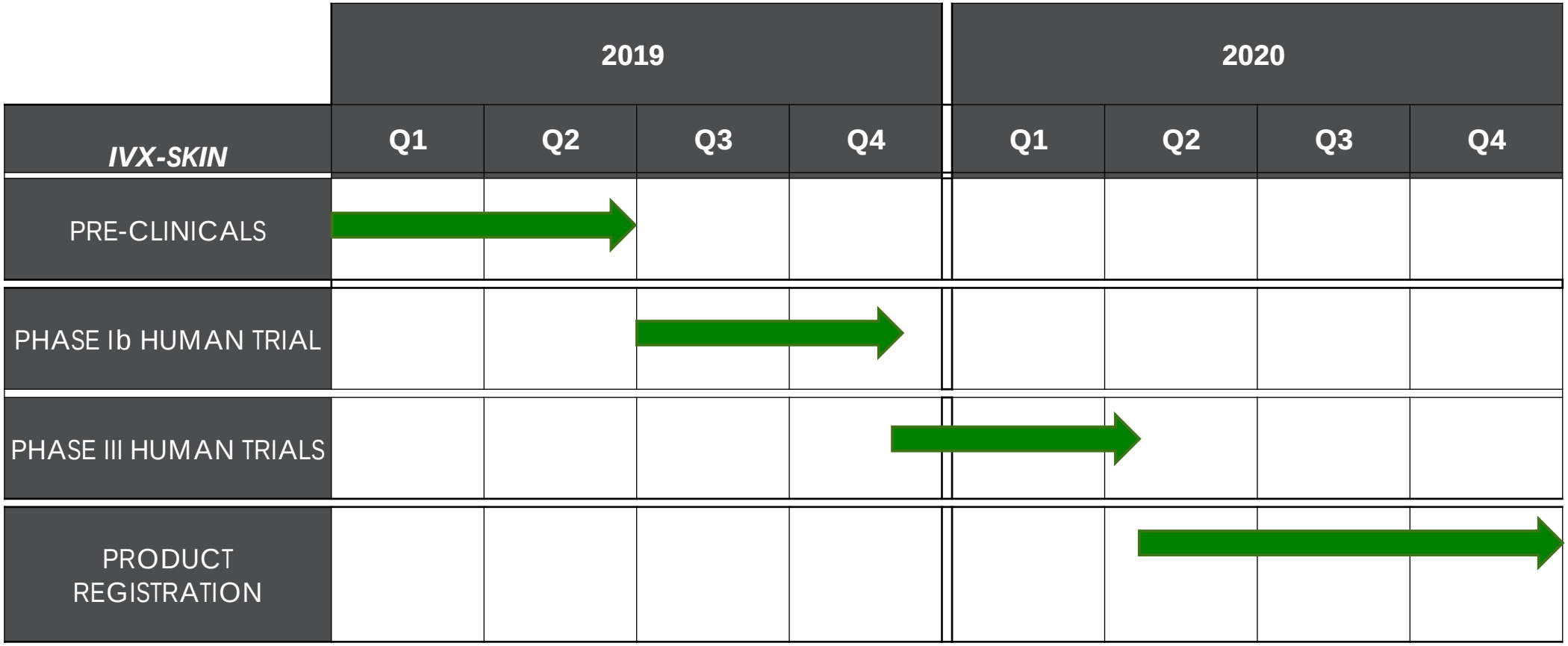
- Global actinic keratosis market was valued at USD 6,561.8 Million in 2015 and is expected to reach USD 8,909.7 Million by 2022
- Market growth expected at a CAGR of around 4.35% between 2016 and 2022.[1]

[1] Actinic Keratosis Market By Treatments (Destructive Treatment, Photodynamic Therapy, Topical Medications, Chemical Peels And Dermabrasion) - Growth, Share, Opportunities & Competitive Analysis, 2016 – 2022"

- https://www.credenceresearch.com/report/actinic-keratosis-market

# IVX-SKIN:
# TIMELINE TO PRODUCT REGISTRATION SUBMISSION

Invion's expected product development timeline to regulatory submission:



# IVX SOLID CANCER PROGRAM:
# EXPLORING INTRAVENOUS TREATMENT FORMULATIONS

Invion is undertaking an initial IV development to support future clinical studies.

Invion will begin clinical studies of IV formulations in solid cancer treatments with a small, controlled orphan indication trial (IVX-MES; therapeutic treatment for Mesothelioma).

This initial study will position Invion's future development of treatments for other solid tumour indications (notably lung, ovarian and prostate cancer).

**Product Characteristics**

- Therapeutic treatment
- Intravenous (IV) compound formulation
- Treatment activated by laser probe
- Compound selectively taken up by cancer cells, not normal tissue

***vivo*Pharm**

- Engaged to undertake pre-clinical studies

**Formulytica**

- Engaged to develop IV formulation of IVX-P02
- Ready for human clinical trials in 2019

# IVX-MES:
# FOR SOLID CANCERS - MESOTHELIOMA

There are over 18 million cases of cancer every year worldwide, with nearly 10 million deaths. Surgery, radiotherapy and chemotherapy are the usual treatments – all have their side-effects. There are many cancers where new treatment options are urgently needed.

**First IV indication:** Mesothelioma is a rare type of cancer that can develop decades after exposure to asbestos

**Phase I Trial**

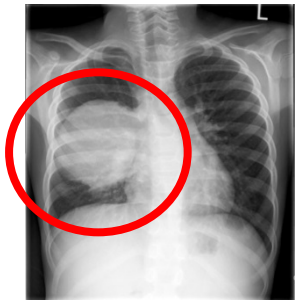
- Test intravenous formulation in healthy volunteers
- Safety and Pharmaco-kinetics defined
- Around 12 participants
- Q3 2019 – Q1 2020
- Will allow for follow on trials in range of cancers

**Mesothelioma Phase III Trial**

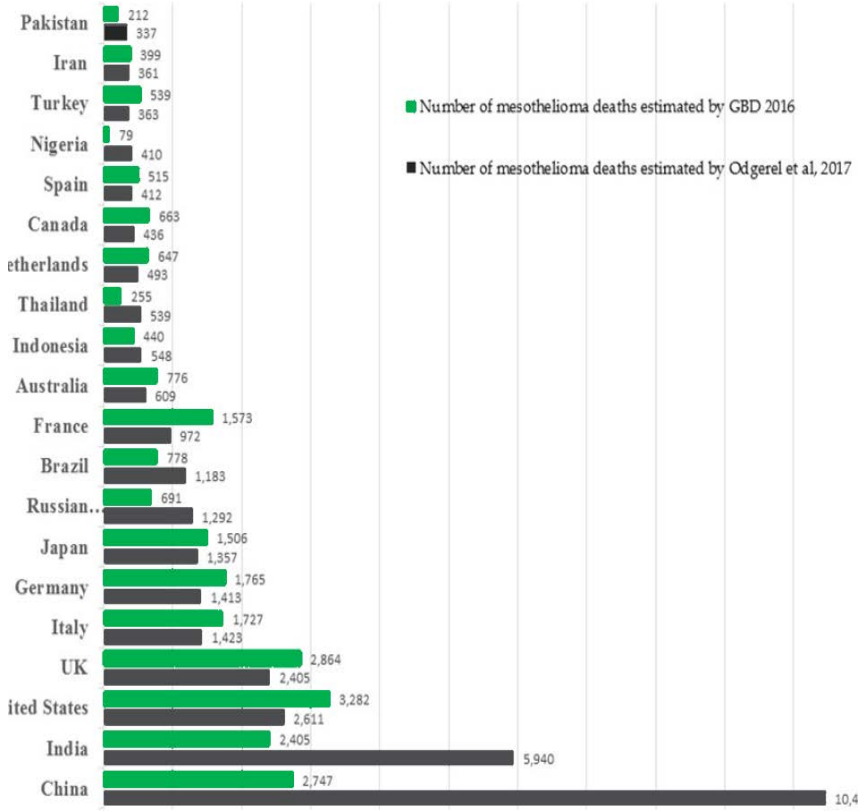
- *IVX-MES* plus surgery in malignant pleural mesothelioma
- Use of laser probe designed for the application
- Use of IV formulation
- 18 patients across 4–6 sites
- Q2 2020 – Q2 2022
- Registration application in Q2 2021, submission for regulatory approval in Q2 2022

# IVX-MES:
# MESOTHELIOMA – A GROWING CANCER MARKET

- Lung cancer accounts for 54–75 per cent of all occupational cancer.
  - Asbestos related cancer accounts for 55–85 per cent of lung cancer and causes other cancers
- Asbestos causes an estimated 255,000 deaths annually – of which work-related exposures are responsible for 233,000 deaths
- Negative impact of Mesothelioma and Asbestos related cancer worldwide:
  - Reported loss for Western European and European Union countries of 0.70% Gross Domestic Product (GDP) or 114,900 million USD.
  - The USA has asbestos-related productivity losses of approximately 0.36% of GDP, or 86,100 million USD.
  - All WHO region's designated as "High income countries" had an estimated loss of 0.48% of GDP caused by asbestos related cancer
- 2,030,000 tons of Asbestos used annually despite being banned in 55 countries.
- Present Asbestos consumption and exposure is expected to cause negative ramifications for the following 30–50 years later. [1]

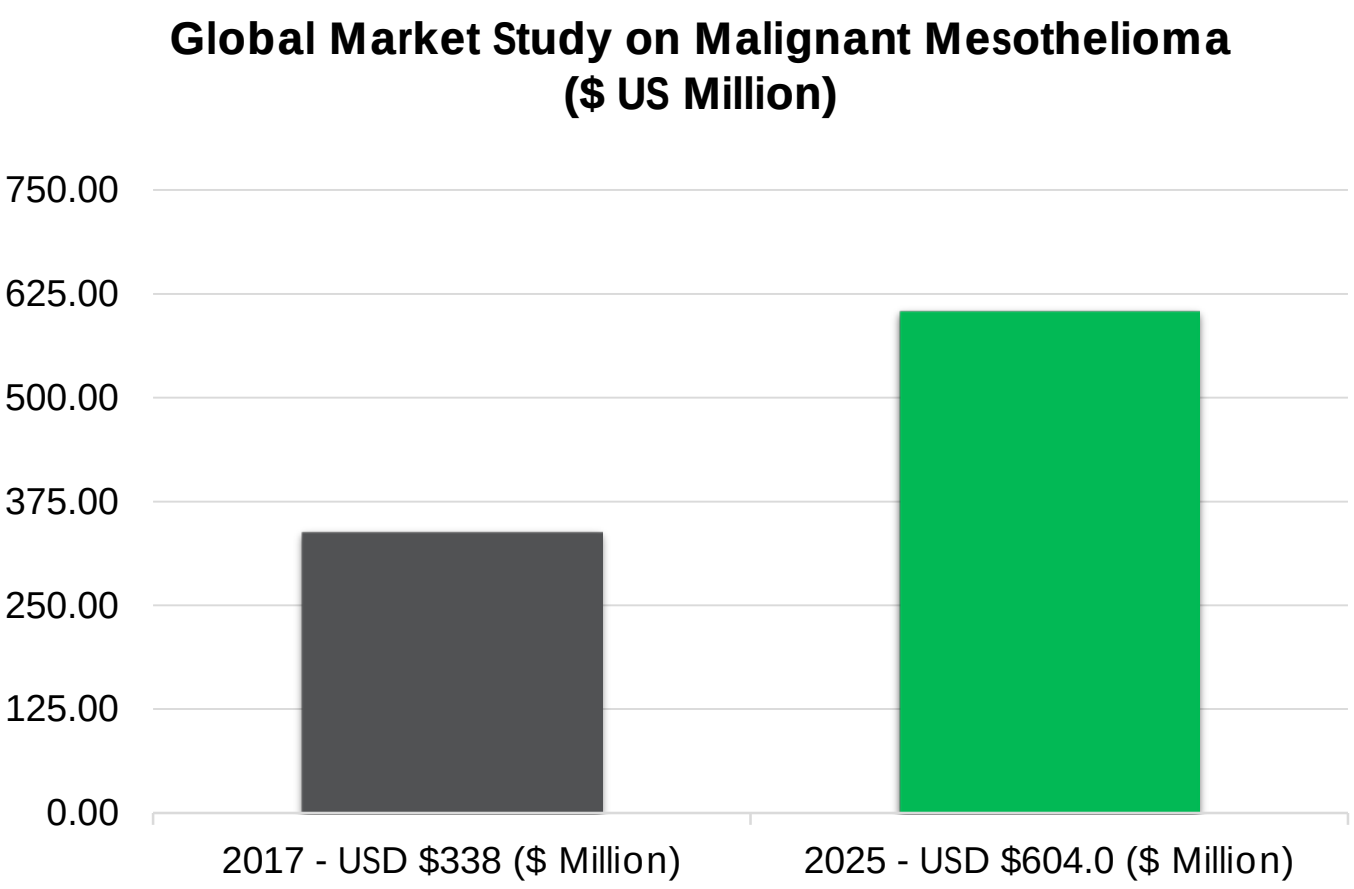


**Comparison of Global Burden of Mesothelioma Deaths for leading countries in terms of mesothelioma deaths (Estimates)**




[1] https://www.ncbi.nlm.nih.gov/pubmed/29772681

# IVX-MES:
# MESOTHELIOMA – POTENTIAL MARKET



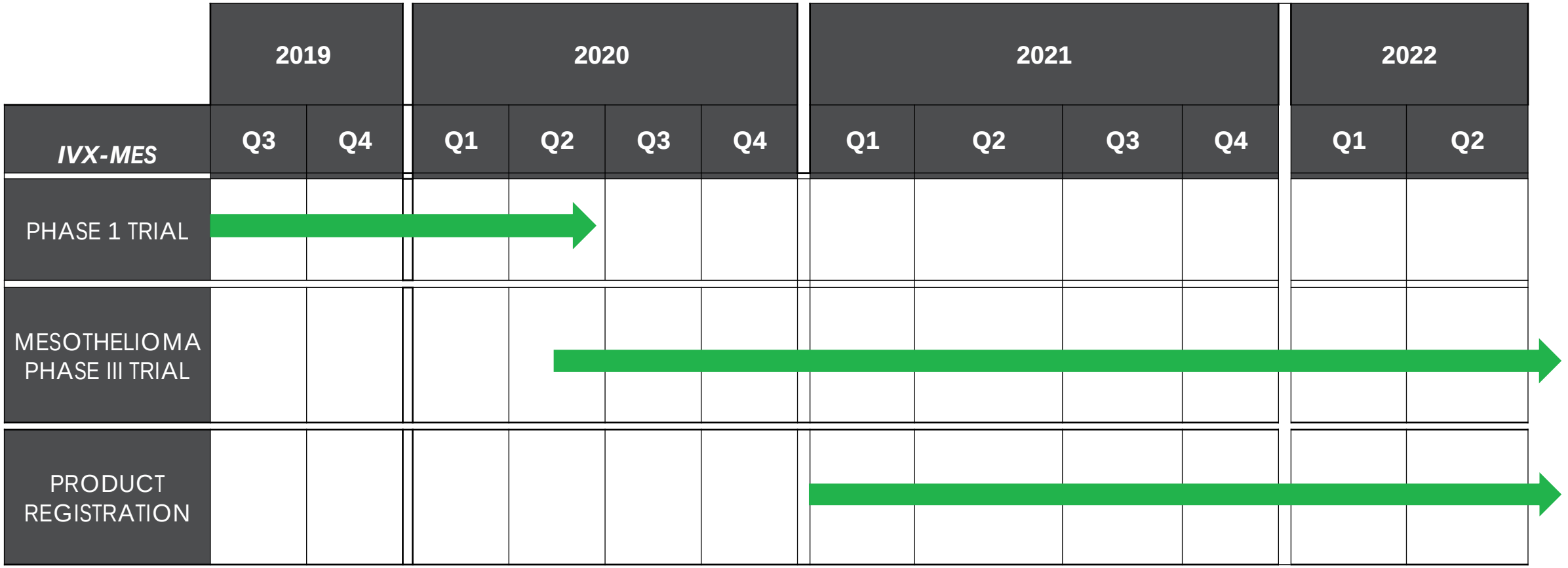

"Global Market Study on Malignant Mesothelioma' – Market research:

- Global malignant mesothelioma market was valued approximately USD 338 million in 2017 and is expected to generate revenue of ~USD 600 million by end of 2025
- Market growth expected at a CAGR of around 7.5% between 2017 and 2025.[1]

[1]Persistance Market Research has published a new report titled "Global Market Study on Malignant Mesothelioma: Cisplatin and Combination Segment Projected to be the Second Most Lucrative Segment by Drug Type' - https://www.persistencemarketresearch.com/market-research/malignant-mesothelioma-market.asp

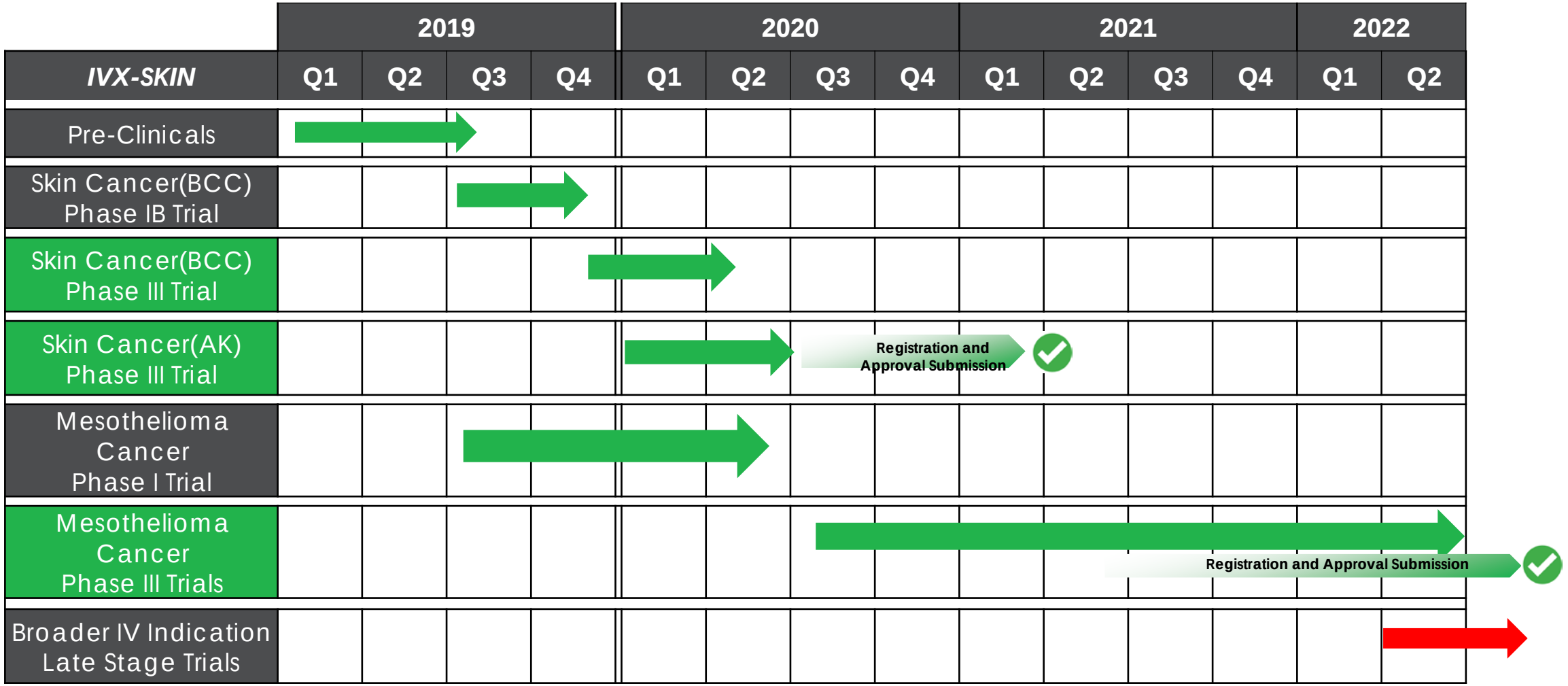
# IVX-MES:
# TIMELINE TO PRODUCT REGISTRATION SUBMISSION

Invion's expected product development timeline to approval:



# CLINICAL DEVELOPMENT PROGRAM

## MULTIPLE PROGRAMS, ACCELERATED APPROACH



# UPCOMING MILESTONES
# EXPECTED NEWSFLOW 2019

| Program / Milestone | 2019 | | | | 2020 |
|---|---|---|---|---|---|
| **IVX Skin** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** |
| Pre-clinical studies commence | | | | | |
| Clinical site and CRO appointed | | | | | |
| Phase Ib (BCC) trial to commence | | | | | |
| Pre-clinical studies – results | | | | | |
| Phase I complete / results readout | | | | | |
| Phase III trials – clinical site and PI appointed | | | | | |
| Phase III trials (BCC & AK) expected to commence | | | | | |
| **IVX MES (Intravenous Indications)** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** |
| Clinical site appointed for Phase I study | | | | | |
| Phase I study expected to commence | | | | | |

# MARKET OVERVIEW

**$0.015**
(At 25th February 2019)

**Market Cap A$82.51m**
(At 25th February 2019)

| | |
|---|---|
| **Focus** | Clinical-stage life sciences company |
| **Issued Shares** | 5,492,272,967 |
| **Cash** (At 29 Jan 2019) | AUD $0.642M |
| **Funding** | Invion has an R&D services agreement with The Cho Group who provide non-dilutive funding for the clinical development of Photosoft™ technology. |
| **Symbol** | IVX |
| **Exchange** | ASX |


| Substantial shareholders | %IC |
|---|---|
| UNLIMITED INNOVATION GROUP LIMITED | 51.24 |
| POLAR VENTURES LIMITED | 9.93 |
| MR HONSUE CHO | 5.17 |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