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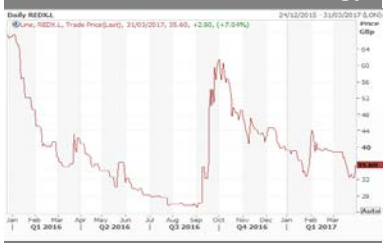
**Pharmaceuticals & Biotechnology**



*Source: Eikon Thomson Reuters*

| Market data | |
|---|---|
| EPIC/TKR | REDX |
| Price (p) | 35.5 |
| 12m High (p) | 113.8 |
| 12m Low (p) | 24.0 |
| Shares (m) | 126.5 |
| Mkt Cap (£m) | 44.9 |
| EV (£m) | 32.9 |
| Free Float* | 59% |
| Market | AIM |

**As defined by AIM Rule 26*

**Description**

Redx Pharma was formed in 2010 as a drug discovery company focused on creating 'best-in-class' drugs in the areas of cancer, infection, and inflammatory disease. With a broad portfolio, Redx is transitioning some of these assets into the clinic. The company's work has been endorsed by partnerships with global pharma companies and the NHS

| Company information | |
|---|---|
| CEO | Neil Murray |
| CFO (interim) | Andrew Booth |
| Chairman | Frank Armstrong |
| | 01625 469 900 |
| | www.redxpharma.com |

| Key shareholders | |
|---|---|
| Directors | 11.7% |
| Seneca Partners | 11.4% |
| Jon Moulton | 10.7% |
| Aviva | 10.0% |
| AXA Framlington | 9.8% |
| Alderley Park Holdings | 4.7% |

| Diary | |
|---|---|
| Aug 16 | Hardman research |
| Oct-16 | Trading update |


| Analysts | |
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# Redx Pharma

## CARB-X – new strategic collaboration

**Although Redx has only been operational since late-2010, it has already discovered several valuable drug candidates, the first of which is about to begin clinical trials. Although management is focusing resources on the clinical-stage projects, it will also be seeking partners to advance its other assets, thereby maximising shareholder value. Redx has announced the first such collaboration with CARB-X to progress its new class of antibiotics against hard to treat *Gram-negative* bacteria. Following a competitive process, Redx has been awarded a grant of $1m over 18 months, with the potential to receive further development milestones.**

- **Strategy:** Redx recently announced a strategic refocus of its activities, moving it from a discovery engine onto a research *and* development organisation. The company will concentrate resources onto its assets in immunology and oncology, two of which are expected to enter human trials later in 2017, and meanwhile to spin-out, partner or out-licence its assets targeting infectious disease.

- **CARB-X grant:** Redx has announced the first such deal. Following a competitive process, the company has been awarded a grant for $1m over 18 months by CARB-X to accelerate progress of its *Gram-negative* anti-bacterial programme towards clinical development. There is also an option for follow on funding through tiered milestones.

- **CARB-X:** Combating Antibiotic Resistant Bacteria Biopharmaceutical Accelerator is a recent initiative between the US Department of Health & Human Service, the Biomedical Advanced Research & Development Authority (BARDA) and the National Institute of Allergy & Infectious Diseases (NIAID). It is being funded by BARDA and the Wellcome Trust, which is providing $155.5m over five years.

- ***Gram-negative* programme:** As part of a consortium, Redx has been trying to identify small molecules that are effective against multi-drug resistant (MDR) bacteria. Initially, it had two discovery projects for *Gram-negative* bacteria, targeting ESKAPE (Klebsiella, Acinetobacter, Pseudomonas, Enterobacteriacae) pathogens that are known to cause many hospital acquired infections.

- **Topoisomerase inhibitors:** In 2016, Redx announced that it had discovered a new series of compounds with greater anti-bactericidal effects in *in vitro* and *in vivo* pre-clinical models. These compounds represent a novel series of patented topoisomerase inhibitors from which a lead compound was expected to be selected.

- **Commercial market:** The global market for antibiotics was estimated to be worth more than $14.5bn in 2016, dominated by generic drugs. The increasing incidence of bacterial resistance to drugs, and of hospital acquired infections, demonstrates the clear medical need for innovative solutions.

- **Investment summary:** Redx's refined strategy is a normal part of a company's evolution. The move from a discovery engine identifying many small molecule assets, to clinical development whereby resources are focused onto its most valuable oncology assets, offers the best opportunity for enhanced shareholder returns. Initiation of clinical trials in 2017 will be an important milestone. Meanwhile, the deal with CARB-X shows that its other assets will not be ignored.

# Gram-negative antibiotics grant

## Refocused strategy

Since inception, Redx Pharma has made considerable progress in its discovery engine, creating several drug candidates in a number of therapeutic areas. This has necessitated a refocusing of its resources onto its two drug leads in the field of cancer and immuno-oncology, both of which are expected to enter man during the next 12 months, along with earlier pipeline programmes in these therapeutic areas, whilst looking to spin-out, partner or out-licence its other assets, thereby increasing shareholder value. The CARB-X collaboration is the first such deal, allowing Redx to progress its *Gram-negative* antibiotic programme to the next stage of development.

## CARB-X grant

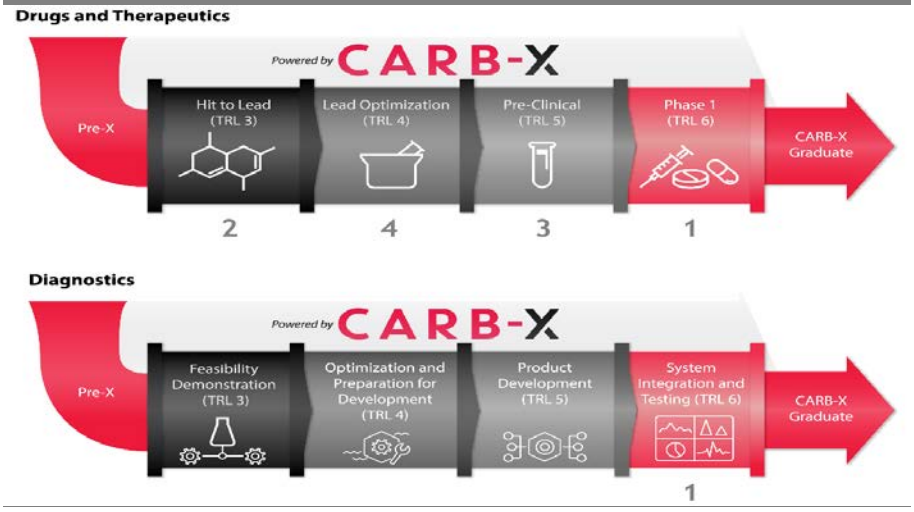
Following a competitive process involving 168 applications, Redx has been selected, together with ten other companies, to receive a $1m grant over 18 months from CARB-X for its *Gram-negative* programme. There is also an option to extend the grant after the initial period with tiered milestones. With this grant, Redx aims to progress its chemical leads rapidly towards clinical development with the goal of delivering a new treatment for serious infections, such as hospital-acquired pneumonia.

### *CARB-X*

CARB-X (Combating Antibiotic Resistant Bacteria Biopharmaceutical Accelerator) is a very recent initiative of the US Department of Health & Human Service, together with the Biomedical Advanced Research & Development Authority (BARDA) and the National Institute of Allergy & Infectious Diseases (NIAID) and involves many other prestigious partners. CARB-X has been created in response to the U.S. government's 2015 Combating Antibiotic Resistant Bacteria (CARB) initiative and the call from the UK government in 2016 for a concerted global effort to tackle antibiotic resistance. CARB-X is funded by BARDA and the Wellcome Trust, with the latter providing $155.5m towards the project over five years. $24m is being invested immediately, with up to a further $24m in milestone payments over three years.

CARB-X will initially have 10 projects at different stages of development, as well as developing a diagnostic platform with one project already in feasibility studies.

**CARB-X mechanism**




*Source: CARB-X*

CARB-X is dedicated to finding new antibiotic therapies and helping to accelerate their progress through to clinical development. CARB-X is focusing on 18 drug resistant strains categorised by the US Centers for Disease Control & Prevention (CDC) as urgent (x3), serious (x12) and concerning (x3).

## Redx's Gram-negative programme

Over the last five years, Redx has been attempting to discover and develop compounds effective against multi-drug resistant (MDR) bacteria. Initially, it had two discovery projects for *Gram-negative* bacteria, targeting ESKAPE (Klebsiella, Acinetobacter, Pseudomonas, Enterobacteriacae) pathogens which are known to cause urinary tract and intra-abdominal infections, pneumonia, and complicated skin, soft tissue, and cystic fibrosis infections. This programme was funded in part by IMI (European Innovative Medicines Initiative), led by GlaxoSmithKline and Sanofi.

### *Gram-negative bacteria*

Gram-negative bacteria have the distinct characteristic of possessing a cell envelope that contains an additional outer lipid membrane. This characteristic confers the bacteria with a higher degree of protection from current antibacterial drugs, posing a huge challenge for the whole healthcare system. In hospital settings, *Gram-negative* bacteria cause serious infections including pneumonia, bloodstream infections, wound or surgical site infections, and meningitis.

### *Topoisomerase inhibitors*

In September 2016, Redx announced that it had discovered a new chemical class of antibiotics, which act as topoisomerase inhibitors, that possessed a distinct mode of action that differed from previous chemical classes such as quinolones. This is significant as there has been no new chemical class of *Gram-negative* antibiotics discovered since 1962. In a series of *in vitro* experiments, Redx identified a series of small molecules targeting topoisomerase proteins, key enzymes that bind to the DNA strand facilitating DNA replication and transcription. Inhibition of these enzymes prevents these activities, reducing the number of bacterial colonies.

### *In vivo proof-of-concept*

Redx also reported a positive antibiotic effect in an *in vivo* pre-clinical study, with its compounds achieving a significant decrease in infection levels against multi-drug resistant *Gram-negative* bacteria. The experiment compared responses from its new series of compounds to those achieved with tigecycline, a well-known drug used in severe and antibiotic-resistant bacteria infections. Overall, Redx's compounds achieved a significant and greater anti-bacterial effect. At that point in time, Redx was in the process of selecting a lead candidate from this group of compounds to take into the next stage of development.

## Conclusion

Redx recently announced a restructuring that moved the group from a discovery engine to a research *and* development company, focusing its cash resources into its oncology and immunology pipeline and particularly those projects that are expected to start Phase I clinical trials in 2017. The intention is to identify potential partners and collaborators to progress and fund its other infectious disease assets. The collaboration with CARB-X for its *Gram-negative* programme is the first such funding arrangement to be announced, and the initial $1m grant over 18 months will be sufficient to move this project forward. It also carries the prospect of further funding in the event that the Redx project hits various milestones.

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