



WWW.QNUTRAPHARMA.COM

# Liposomal Iron 15mg

Increased bioavailability and absorption

## Nutritional Information

One capsule provides:

	*%NRV
Liposomal iron	300 mg
providing:	
Iron	15 mg

\*Nutrient Reference Values

Take one capsule daily with food. Swallow with water.



## SUMMARY

- Advanced delivery of oral iron.
- High bioavailability and absorption of iron.
- Increased cellular delivery of iron.
- Liposomal iron is well tolerated.
- Highly stable iron and protected from degradation.
- Supported by studies and advanced manufacturing processes.

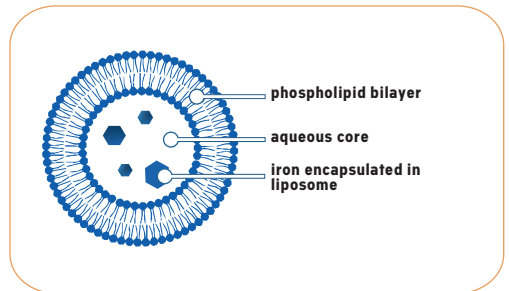
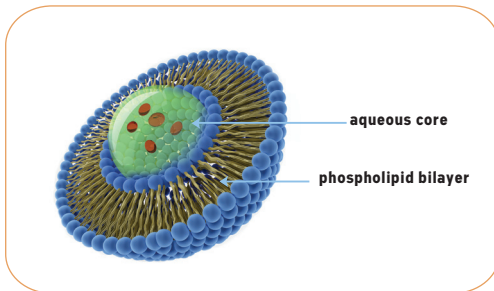
## LIPOSOMES & LIPOSOMAL DELIVERY

Liposomes are a form of lipid-based delivery that promote intestinal absorption, intracellular uptake and bioavailability of active nutrients, such as iron. Liposomes are microscopic-sized spherical envelopes or pockets containing an aqueous core. The phospholipids are arranged into a spherical cell membrane like lipid bilayer, known as a phospholipid bilayer.

Liposomes structures can be used for advanced delivery of iron, which is then described as liposomal iron. The liposomal iron is created through a careful manufacturing process resulting in an innovative delivery form of the nutrient with significant advantages for the consumer.

In the case of water-soluble nutrients (hydrophilic), such as iron, the active nutrient is entrapped inside the aqueous core of the liposome.

### Illustrations of liposomal iron structure



## ADVANTAGES OF LIPOSOMAL DELIVERY OF IRON

The advantages of liposomal nutrients are derived from the liposome structure itself. Iron is contained within the aqueous core and is sealed and encapsulated. Liposomal encapsulation provides a barrier around the active iron, increasing resistance to digestive enzymes, acidity, intestinal flora, and oxidation. This results in the protection of the iron active nutrient from degradation and oxidation as well as protecting the digestive tract from potential irritation, thereby improving delivery and bioavailability. In addition,<sup>1</sup> interactions between the liposome's phospholipid bilayer membrane and the body's cell membranes offer enhanced cellular uptake through endosomal mechanisms.

As a result, the advantages of liposomal nutrients include:

- High bioavailability and absorption of iron compared with conventional oral forms of iron.
- Protection of iron against the acid environment of the stomach, oxidation, and degradation.
- Protection of the digestive tract from potential irritation by iron.
- Increased transmucosal (oral) uptake and absorption of iron.
- Increased intracellular delivery of iron.
- High stability of iron.
- Cost effective by being able to take a lower dose of iron for the same effect.

## STUDIES OF LIPOSOMAL DELIVERY OF IRON

---

### Higher Intracellular uptake

A study of intracellular iron transport at 50µmol/L concentration for 120 minutes incubation period using a Caco-2 cell study found a >30% increase in cellular uptake of liposomal iron compared to iron glycinate.<sup>2</sup>

### Higher absorption and bioavailability

Two studies, including a randomized cross over trial, have showed that absorption and iron serum/plasma levels from liposomal iron supplementation was >50% higher than other iron forms.<sup>3,4</sup>

Another study comparing liposomal iron (30mg/day) to ferrous sulphate (105mg/day) supplementation for 12 weeks found that more patients taking liposomal iron achieved an increase in 2g of haemoglobin levels after the 12 week treatment.<sup>5</sup>

### Comparable to IV Iron Therapy after 3 months

Oral liposomal iron supplementation has been favourably compared to intravenous (IV) therapy over 3 months in one study. Typically IV administration of iron has been considered to be superior to oral iron supplementation. However in the case of liposomal iron supplementation (30mg/day liposomal iron) orally, the effect on increasing haemoglobin levels was the same as IV administration of iron (150mg/week iron gluconate).

Comparing the IV regime to oral supplementation with liposomal iron, the study found that both were effective in increasing haemoglobin levels by the end of 3 months treatment.<sup>6</sup>

## OVERCOMING THE ISSUES WITH CONVENTIONAL IRON SUPPLEMENTATION

---

Well known shortcomings of conventional oral iron supplementation are poor iron absorption (10–15%), low bioavailability and poor tolerability leading to noncompliance. Iron absorption can also be lowered by concurrent intake of iron absorption inhibitors like phosphates, phytates, and tannates in food and certain digestive disorders.

Oral supplementation of iron in liposomal form offers significant advantages due to the protective encapsulation provided by the liposome structures increasing absorption and bioavailability and reducing adverse side effects.

Oral supplementation with iron is often associated with nausea, vomiting, gastric discomfort, sensation of heaviness, and poor gastrointestinal tolerability. It is reported in the studies that about 30% of patients may experience adverse reactions with the conventional oral iron. However, liposomal iron has been evaluated in several studies and has shown to have less common side effects when compared to conventional oral iron supplementation.

Studies show that liposomal iron is better tolerated with few/absence of adverse effects and therefore, patients are more compliant.<sup>7</sup> One study showed that adverse events occurred only in 3.1% of subjects on oral liposomal iron (compared to standard 30% in conventional iron).<sup>8</sup> In one comparative study, patients on oral liposomal iron had lower drug-related adverse event as compared with IV iron group (3.1% vs 34.5%) and no serious adverse effects were noted with liposomal iron.<sup>9</sup>

## LIPOSOMAL MANUFACTURING PROCESS

---

The Liposomal nutrients used by Quest are supplied by Lipovit® and manufactured using a carefully controlled manufacturing process and the liposome structures are additionally verified using cryogenic transmission and scanning electron microscopy. Particle size plays a vital role in nanoparticle adhesion to and interaction with biological cells in the body.<sup>10,11</sup> At Quest we use Liposomal nutrients within a particle size of 200-400 nanometres (nm), ensuring they are a highly effective delivery system. The size of the liposomes and their particle size distribution are determined using a LUMiSizer® 651 particle size analyzer.

Image of Lipsovit® liposome structures using cryogenic transmission electron microscopy.

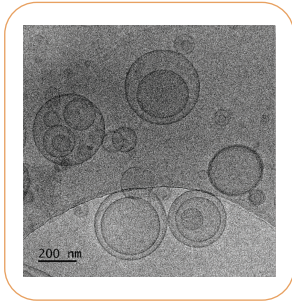


Image of Lipsovit® liposome structures using x1000 magnification under scanning electron microscope.



## BENEFITS OF IRON SUPPLEMENTATION

The main function of iron in the diet is as an important constituent of the blood pigment haemoglobin. Haemoglobin is contained within red blood cells and carries oxygen around the body. Iron is also found in myoglobin (the equivalent of haemoglobin found in muscle) and is additionally a participant in energy releasing reactions in the body. Symptoms of iron deficiency include fatigue, light-headedness, weakness, pallor (paleness), impairment in work capacity and intellectual performance and weakened immune system. Iron contributes to the reduction of tiredness and fatigue and to normal energy-yielding metabolism in the body.

## HEALTH NEEDS



ENERGY



PREGNANCY & WOMEN'S HEALTH  
FERTILITY



## SCIENTIFIC REFERENCES

1. Nanoscale Res Lett 8, 102 (2013)
2. Afri Health Sci. 2017;17(3): 933-941.
3. Int J Pharm. 2013 Sep 15;454(1):82-9.
4. Nutrients 2022, 14(16), 3321
5. Gastroenterology May 2014 146(5):S-591
6. Nephrol Dial Transplant. 2015 Apr;30(4):645-52
7. Exp Rev Hematol 2016;9(Suppl 1):1-42
8. Nephron Clin Pract 2005 Apr;100(3):c55-c62
9. Nephrol Dial Transplant 2015 Apr;30(4):645-652
10. Biomaterials. 2005;26: 2713-2722
11. Small. 2010;6:12-21