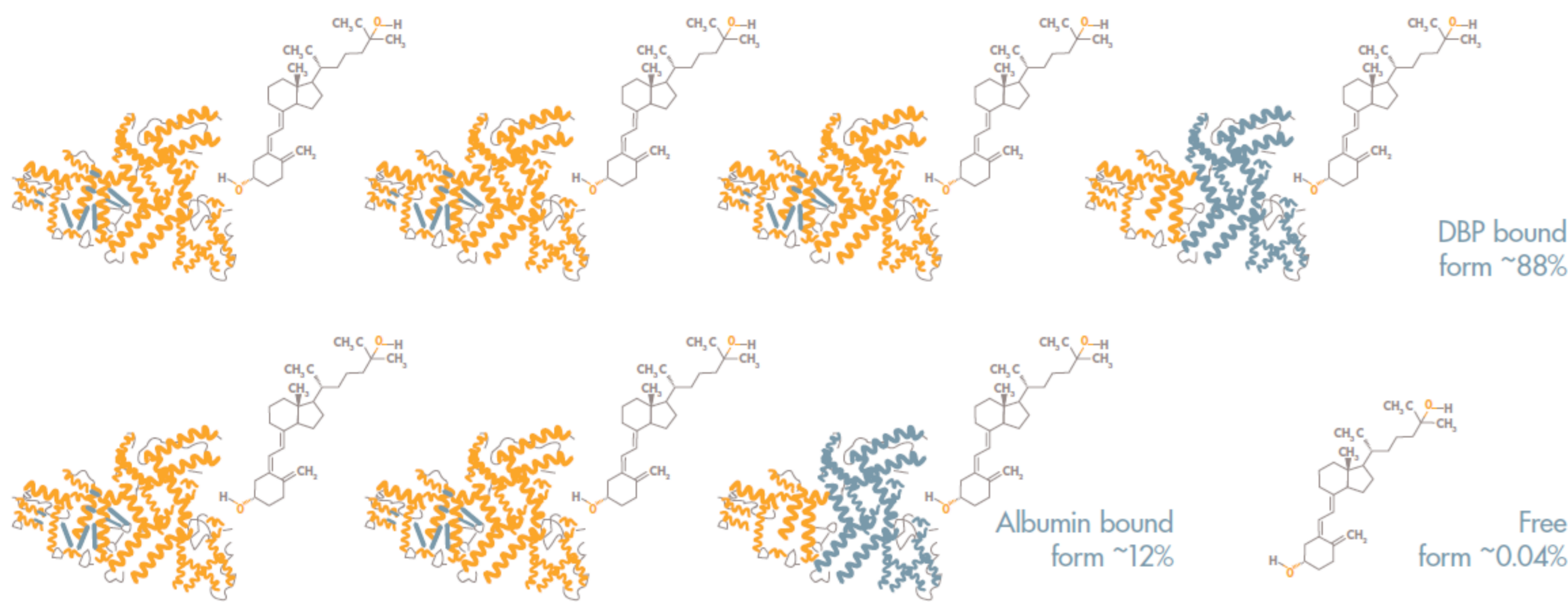


WILL FREE 25OH VITAMIN D MEASUREMENT REPLACE THE CURRENT TOTAL 25OH VITAMIN D TEST IN IVD LABORATORIES?

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> Free 25OH Vitamin D represents 0.04% of the total 25OH Vitamin D

Almost all circulating 25OH Vitamin D in serum is bound to Vitamin D Binding Protein DBP (88%) and Albumin (12%). A very small fraction, approximately 0.04% of the 25OH Vitamin D, circulates in the free, non-protein bound form.



> Conditions affecting the free 25OH Vitamin D concentration

The concentration of DBP is not constant and can be influenced by a number of factors including

- ⊗ Obesity
- ⊗ Pregnancy
- ⊗ The use of oral contraceptives
- ⊗ Hormone replacement therapy
- ⊗ Liver disease
- ⊗ Renal disease
- ⊗ Proteinuria
- ⊗ Intensive care

In case of elevated concentration of DBP the % of free 25OH Vitamin D is decreased. In case of decreased concentration of DBP the % of free 25OH Vitamin D is increased.

- ⊗ The supplementation with **Vitamin D2 or D3** also affects differently the free 25OH Vitamin D levels.

> Current methodology to evaluate individual's Vitamin D status

The measurement of total 25OH Vitamin D is currently the best method to evaluate individual's Vitamin D status.

- By CLIA and LC-MS mainly
- Different cutoffs according to the institution (10 – 20/30 ng/mL)

This test is recommended

- the diagnosis of Vitamin D insufficiency or deficiency,
- to help identify individuals who may benefit from Vitamin D supplementation to reach optimal levels
- in monitoring response to Vitamin D supplements for the treatment of bone-related diseases, such as rickets (children), osteomalacia, postmenopausal osteoporosis, and renal osteodystrophy or non bone-related diseases,
- in the diagnosis of Vitamin D toxicity, e.g., patients with suspected toxicity (hypercalcemia).

> The Eurostars 10 863 project

Future Diagnostics and DIAsource Immunoassays have received a Eurostars grant for the development of a Free 25OH Vitamin D assay for use in the IVD market. The project was chosen from 331 eligible applications, and was further approved for funding by the national funding bodies of the project consortium.

This project will allow further studies to be undertaken to demonstrate conclusively the clinical utility of this assay, to seek CE marking for the assay and to establish a clear positioning for this new marker prior to launching it in the global IVD Vitamin D market.

> Free Vitamin D during CKD

⊗ **Hypothesis:** Because Vitamin D binding is altered during CKD, it has been proposed that serum free 25OHD better reflects Vitamin D metabolism than total 25OHD.

⊗ **Method:** Serum free 25OHD and total 25OHD were measured in 34 CKD patients.

⊗ **Results and discussion:** The ratio free/total 25OHD strongly decreases with the decline of kidney function ($r=0.55$ $p<0.001$). Free 25OHD may therefore represent a new target for treatment adaptation.

Bouchara A. et al. J. Am. Soc. Nephrol. 27: 2016 TH-PO510. Free vitamin D may be altered during chronic kidney disease.

> Free Vitamin D during Pregnancy

⊗ **Hypothesis:** Because Vitamin D binding is increased during Pregnancy, it has been proposed that serum free 25OHD better reflects Vitamin D metabolism than total 25OHD.

⊗ **Method:** Serum free 25OHD and total 25OHD were measured in 475 apparent healthy pregnant women.

⊗ **Results and discussion:** Total and free serum 25OHD were compared in their correlation with:

- Gestational age: negative correlation with free 25OHD ($p<0.0001$), not with total 25OHD ($p=0.685$).
- Ca: positive correlation with free 25OHD ($p<0.0001$), not with total 25OHD ($p=0.65$).
- PTH: negative correlation with both ($p<0.0001$).
- Targets of Vitamin D related gene activation such as albumin, LDL and Vitamin B6 were correlated to free 25OHD, but not to total 25OHD.

Under publication.

> Free Vitamin D in other fields

Hepatology and **Intensive Care** are two fields in which free 25OH Vitamin D is believed to be more reliable than the actual total 25OH Vitamin D test.

- ✓ Clinical studies ongoing
- ✓ Free 25OH Vitamin D will be CE marked in Q4 2017