

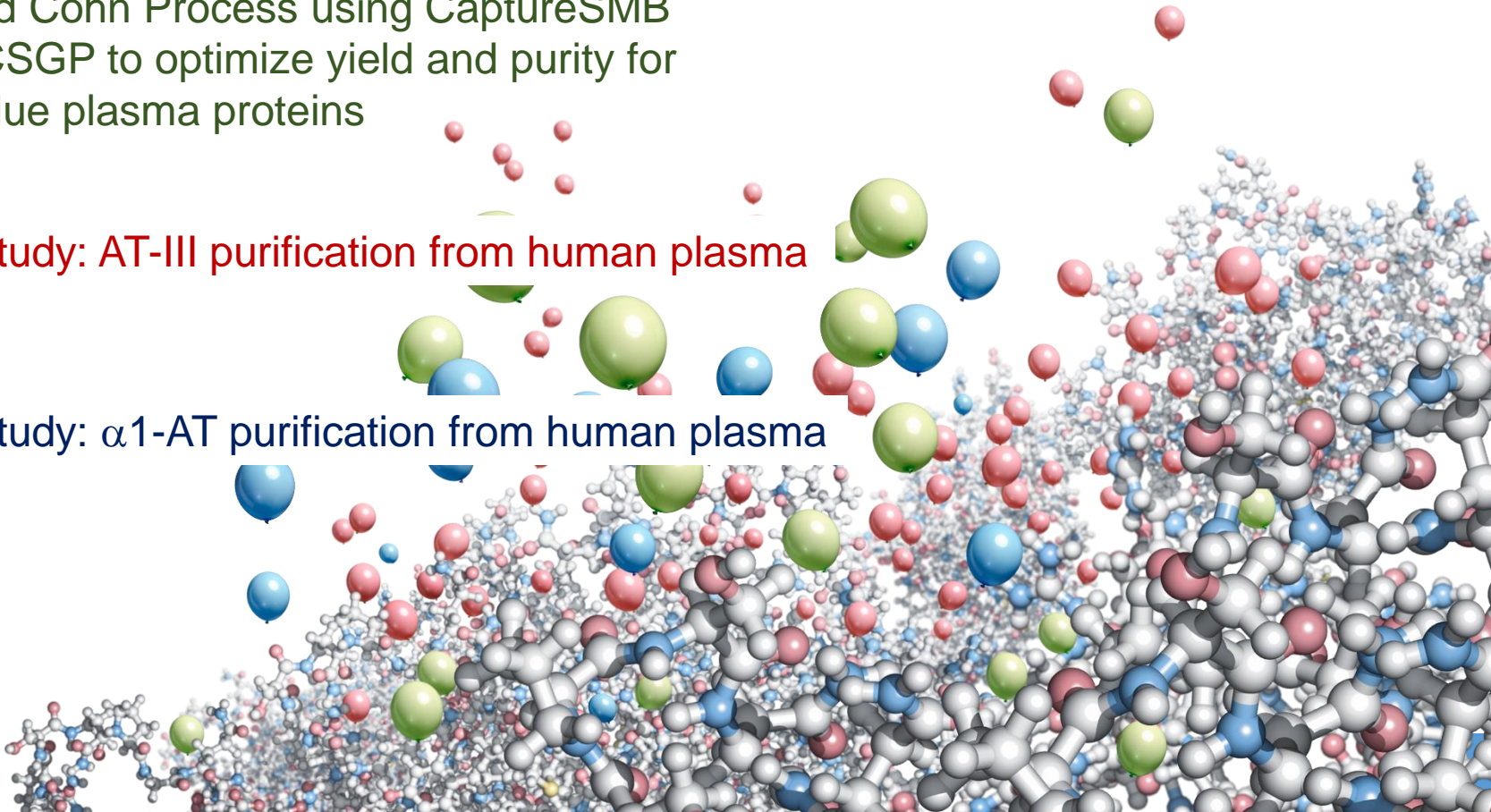


Contichrom[®] Twin-column FPLC Chromatography

Modified Cohn Process using CaptureSMB
and MCSGP to optimize yield and purity for
high value plasma proteins

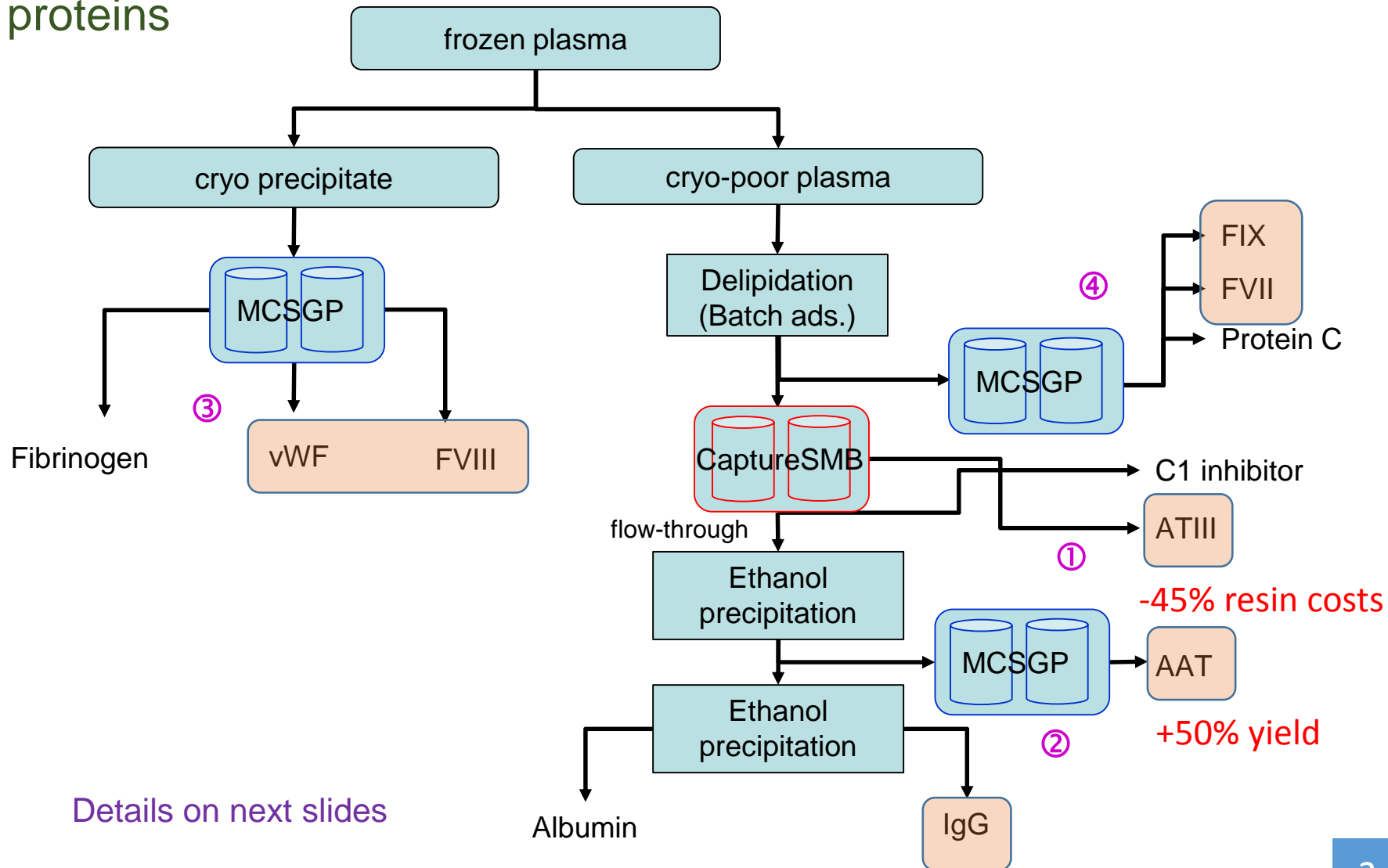
Case Study: AT-III purification from human plasma

Case Study: α 1-AT purification from human plasma



Contichrom® for Plasma Fractionation

- Modified Cohn Process to optimize yield for high value plasma proteins



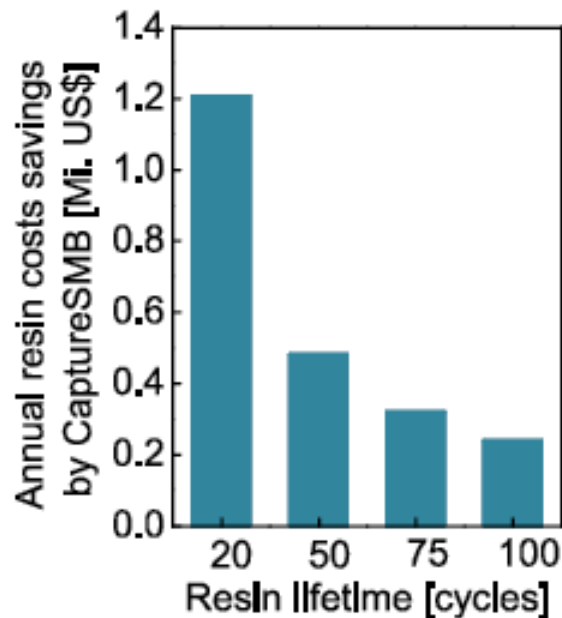
Contichrom® for Plasma Fractionation

- Application ① (cryo-poor plasma branch): The CaptureSMB® process is used to isolate AT-III by Heparin affinity chromatography. The flow-through is processed further for purification of IvIGs and Albumin using the traditional pathway (see case study)
- Application ② (cryo-poor plasma branch): The MCSGP process is used to purify Antritrysin (AAT) with high yield and purity (see case study)
- Potential Application ③ (cryo-precipitate branch): The MCSGP process is used to obtain high-purity Factor VIII and optionally fibrinogen and vWF
- Potential Application ④ (cryo-poor plasma branch): The MCSGP process is used to isolate Factor IX with high yield and purity. In this step, there is the option to isolate FVII and Protein C.
- If the IgGs need to be purified to high purity IVIGs, the MCSGP can be also used for this task

Case study: AT-III purification from human plasma

Application ① (cryo-poor plasma branch): Isolation of AT-III by Heparin affinity chromatography using the CaptureSMB® process.

- ❑ Superior performance of CaptureSMB in comparison to batch chromatography:
- 45% higher loading
 - 38% higher productivity and 29% reduction in buffer consumption



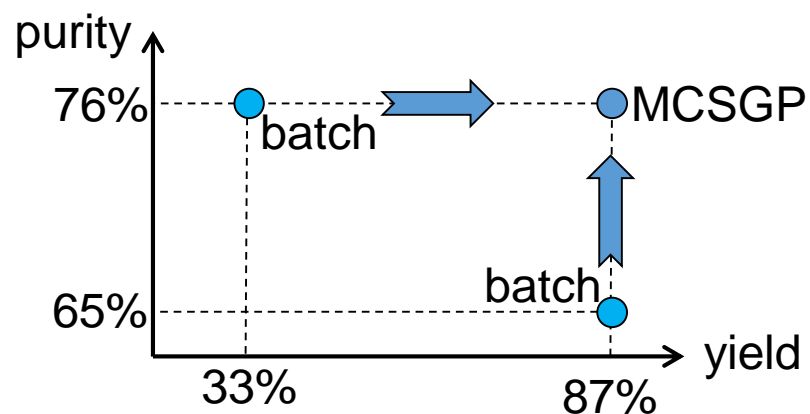
Plasma processed per year	[L]	492800
Pool size	[L]	1600
Pool processing time	[h]	24
AT III concentration	[g/L]	0.1
AT III amount per pool	[kg]	0.16
Effective production per year	[Kg]	49.28
Heparin affinity resin costs	[US\$/L]	8200*

Materials and Methods

- Feed: cryo-supernatant from human plasma (AT III: 0.08-0.24 g/L)
- Column dimensions: Batch (ID 0.5cm x BH 10cm)
CaptureSMB (ID 0.5cm x BH 5cm).
- Resin: Toyopearl® AF-Heparin HC-650 M (Tosoh bioscience)
- Analytics: TSKgel Heparin-5PW (Tosoh bioscience)
- Chromatographic equipment: ContiChrom® Lab-10 (ChromaCon AG)

Case study: α 1-AT purification from human plasma

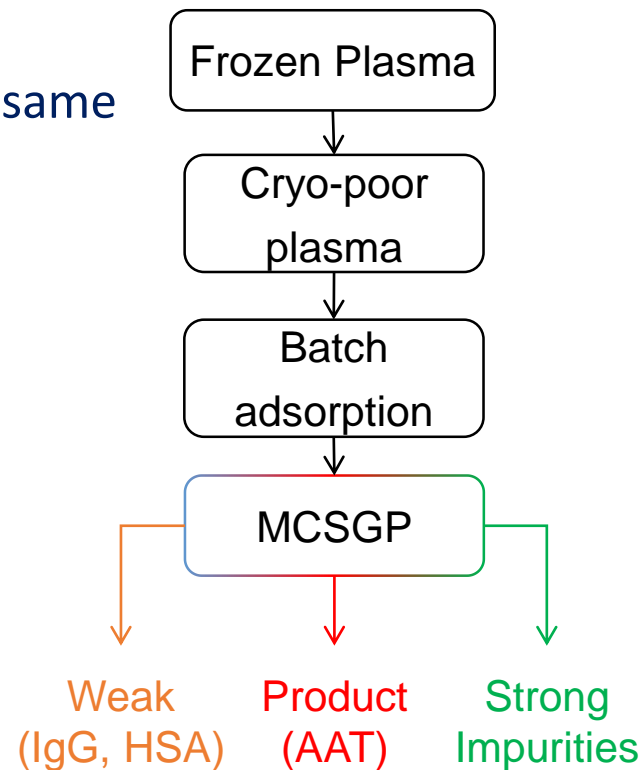
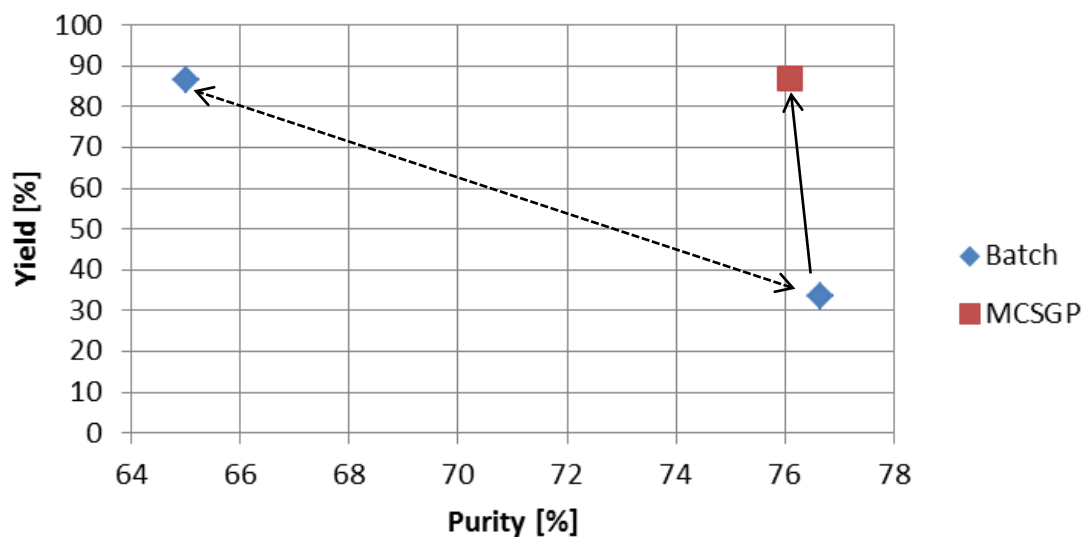
Application ② (cryo-poor plasma branch): A Contichrom[®] Prep unit (MCSGP) is used to purify Anti-trypsin (AAT) with higher yield and purity when compared to batch chromatography:



(results presented at SPICA 2012 conference by ETH Zurich, slides available through ChromaCon)

Case study: α 1-AT purification from human plasma

Application ② : Replacement of a batch DEAE chromatography step by MCSGP chromatography (same resin)



	Purity [%]	Yield [%]
Batch (max. P)	76.7	33.4
Batch (max. Y)	65.0	86.5
MCSGP	76.1	86.7

Contichrom® for Plasma Fractionation Summary

- Potential improvement of Cohn process: By using chromatography → increasing yield of AAT (A1PI), the revenues can be increased significantly
- With Contichrom a further 50% improvement is possible!! → **>1'000 USD/L plasma**

Source

A comparative study of Cohn and chromatographic fractionation using a novel affinity "Cascade Process".

John Curling, Dev Baines, Christopher Bryant, Ruben Carbonell, Tom Chen, Patrick Gurgel, T. Hayes

4thPlasma Product Biotechnology Meeting
Porto Elounda, Crete, Greece, 9-12 May 2005

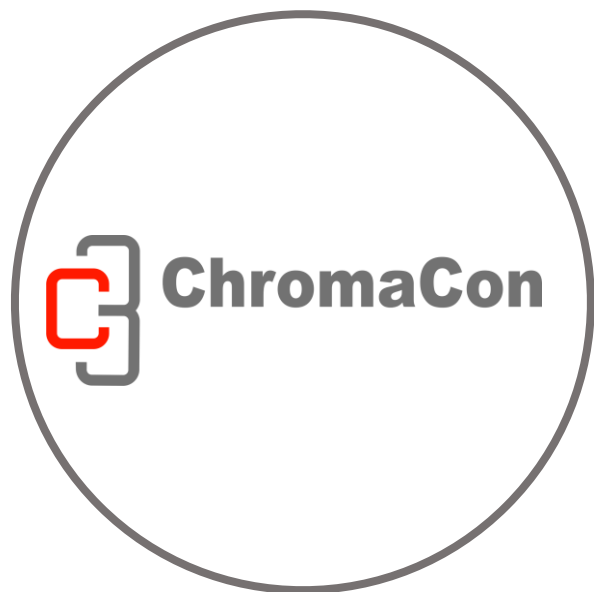
Cascade	vWF/FVIII	IgG	Albumin	A1PI	
Yield	52%	70%	73%	68%	
\$/g	\$10,000	\$38	\$2.25	\$330	
g/batch	18	20,975	89,500	3,552	
\$MM / yr	26.7	117.2	29.6	172.3	
\$ / L plasma	\$52	\$228	\$57.5	\$335	\$672.5

Cohn	vWF/FVIII	IgG	Albumin	A1PI	
Yield	18%	51%	86%	15%	
\$/g	\$10,000	\$38	\$2.25	\$330	
g/batch	6	15,243	105,000	798	
\$MM / yr	9.1	85.1	34.7	38.7	
\$ / L plasma	\$18	\$165.5	\$67.5	\$75	\$326

Batch size = 3,500 litres



Contact Info



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