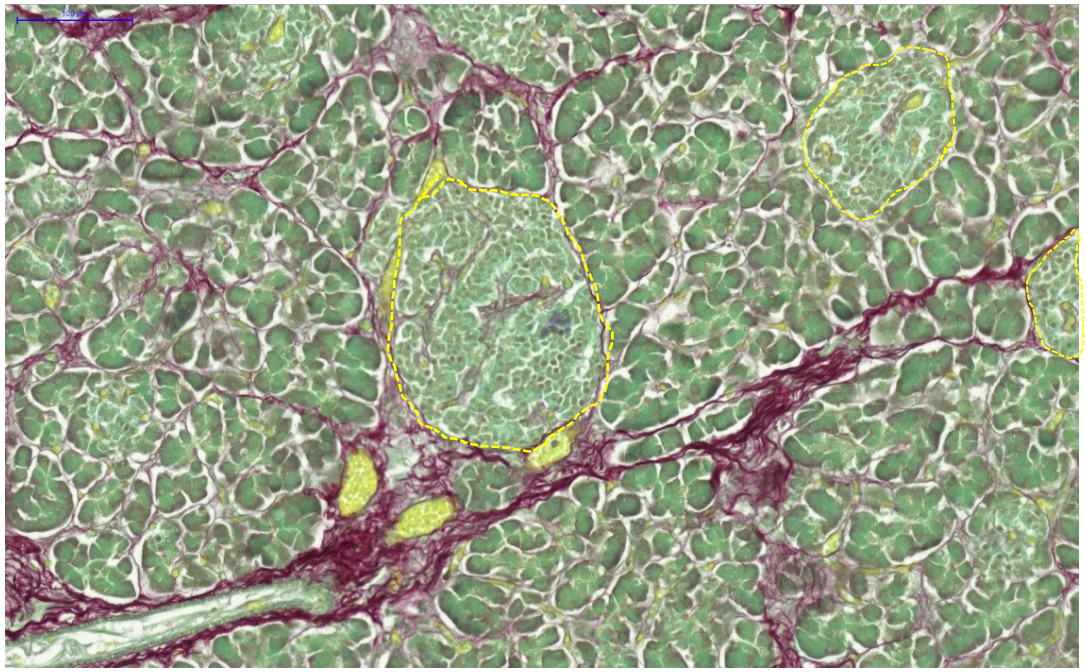
New Insights into Islet Biology in Congenital Hyperinsulinism

ESPE Congenital Hyperinsulinism Family Conference
September 30th 2015



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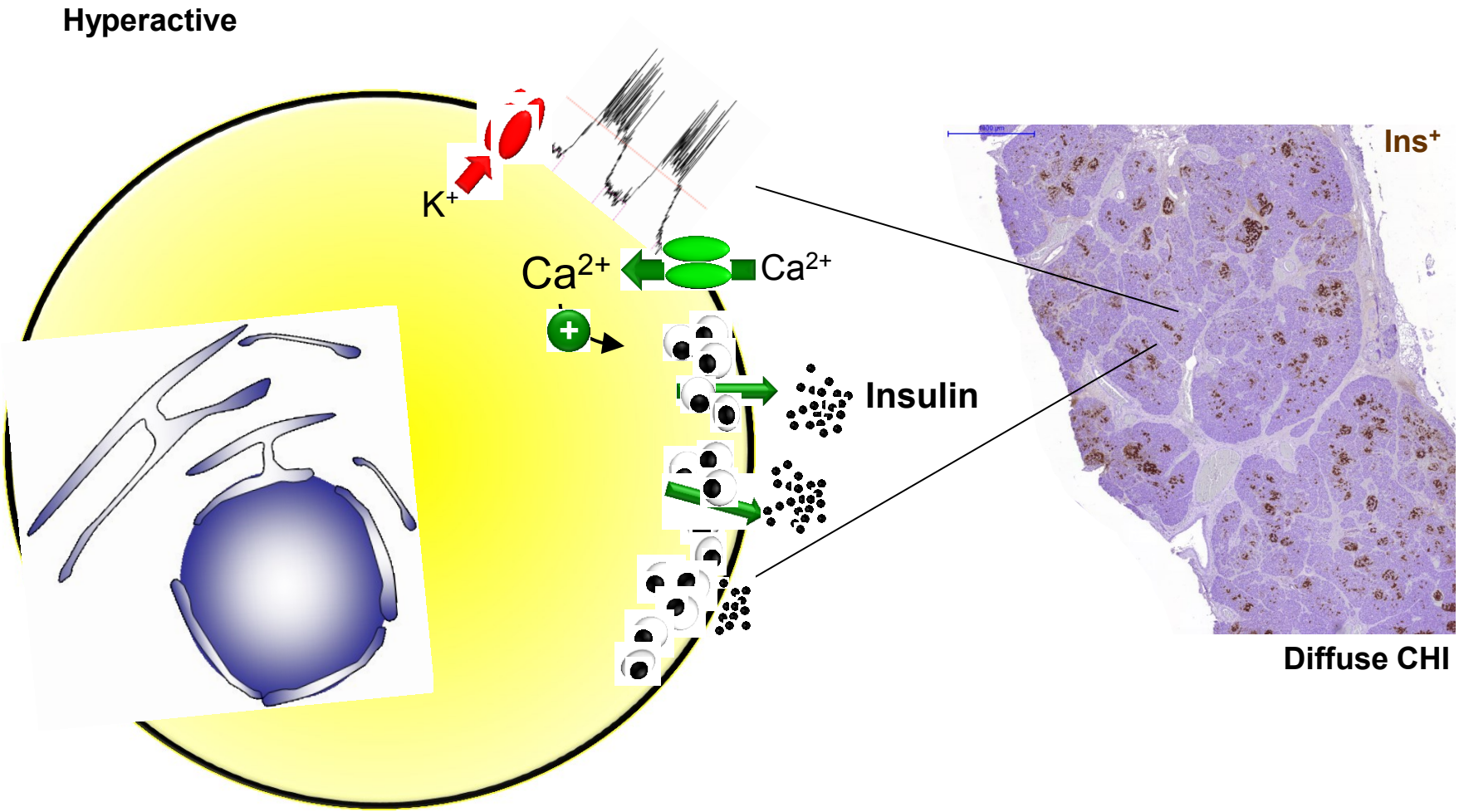
Neil Hanley
Karl Kadler
Mark Dunne

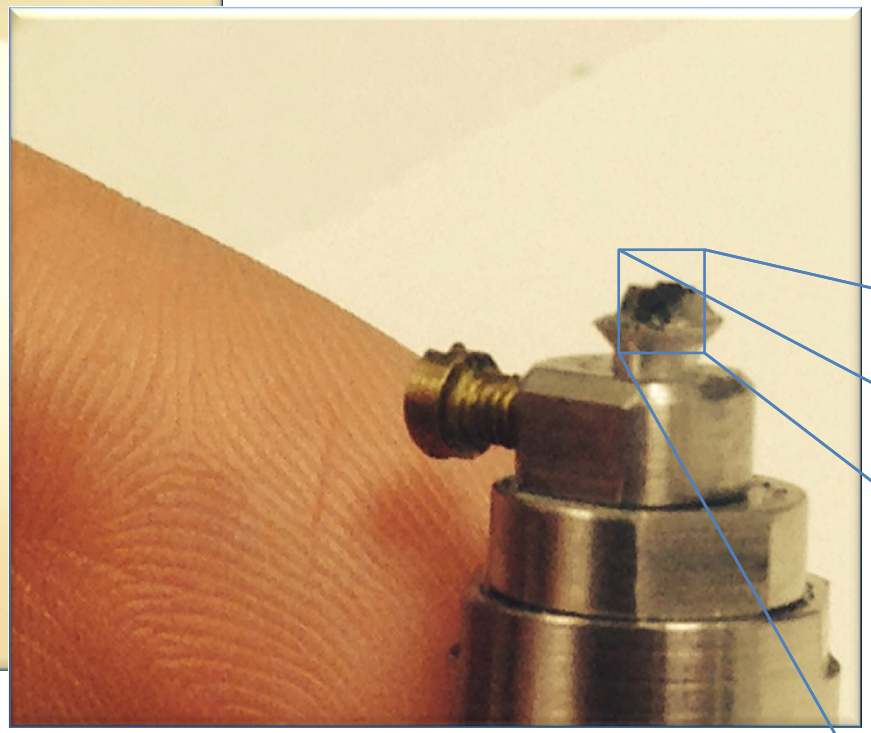
Central Manchester University Hospitals NHS
NHS Foundation Trust

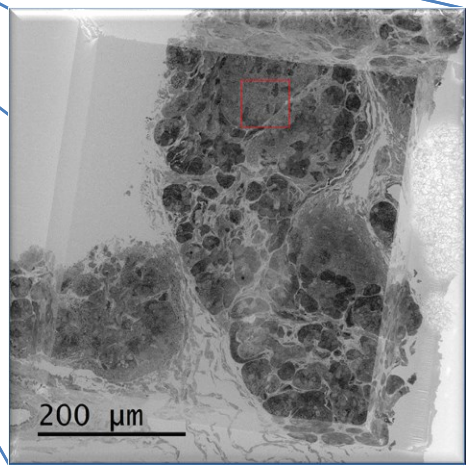
Indi Banerjee
Lindsey Rigby
Zainaba Mohamed
Raja Padidela
Mars Skae
Hima Avatapalle
Peter Clayton
Melanie Newbould
Gauri Batra
Maria Salomom-Estebanez

The β-Cell in Congenital Hyperinsulinism in Infancy



SBFSEM and Islets: Congenital Hyperinsulinism in Infancy





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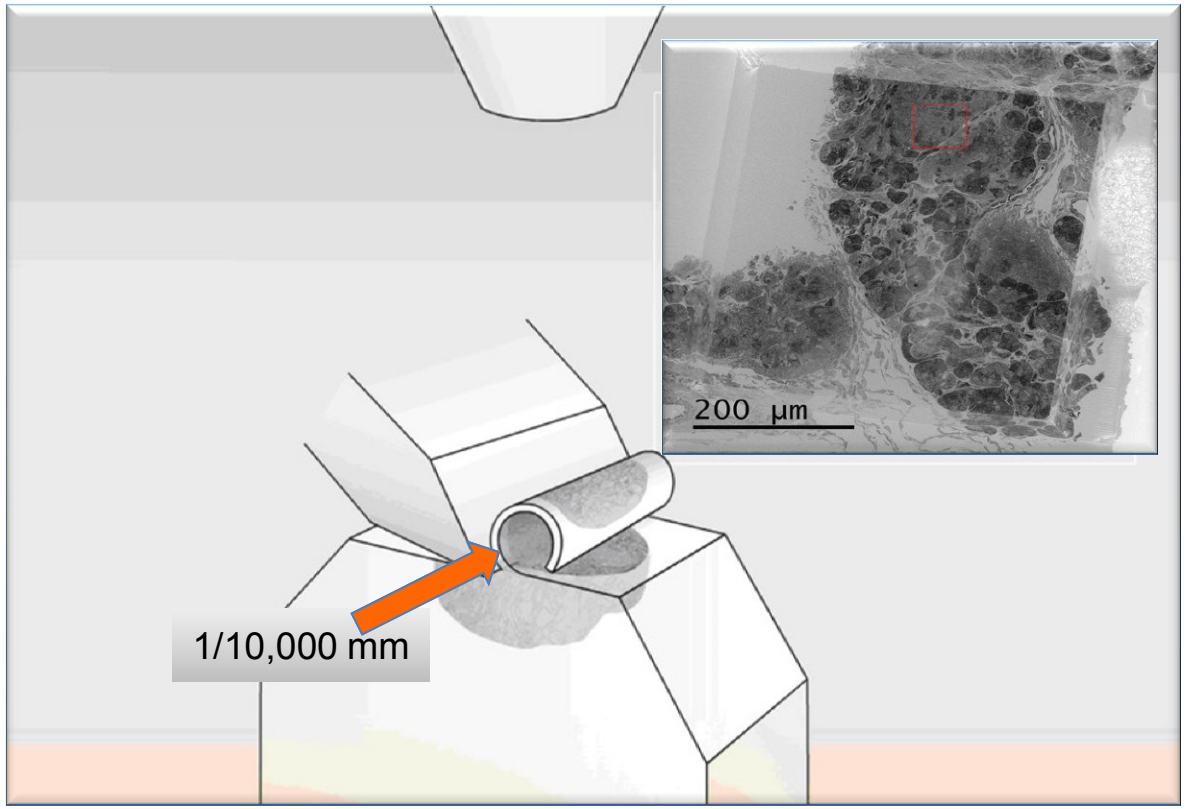

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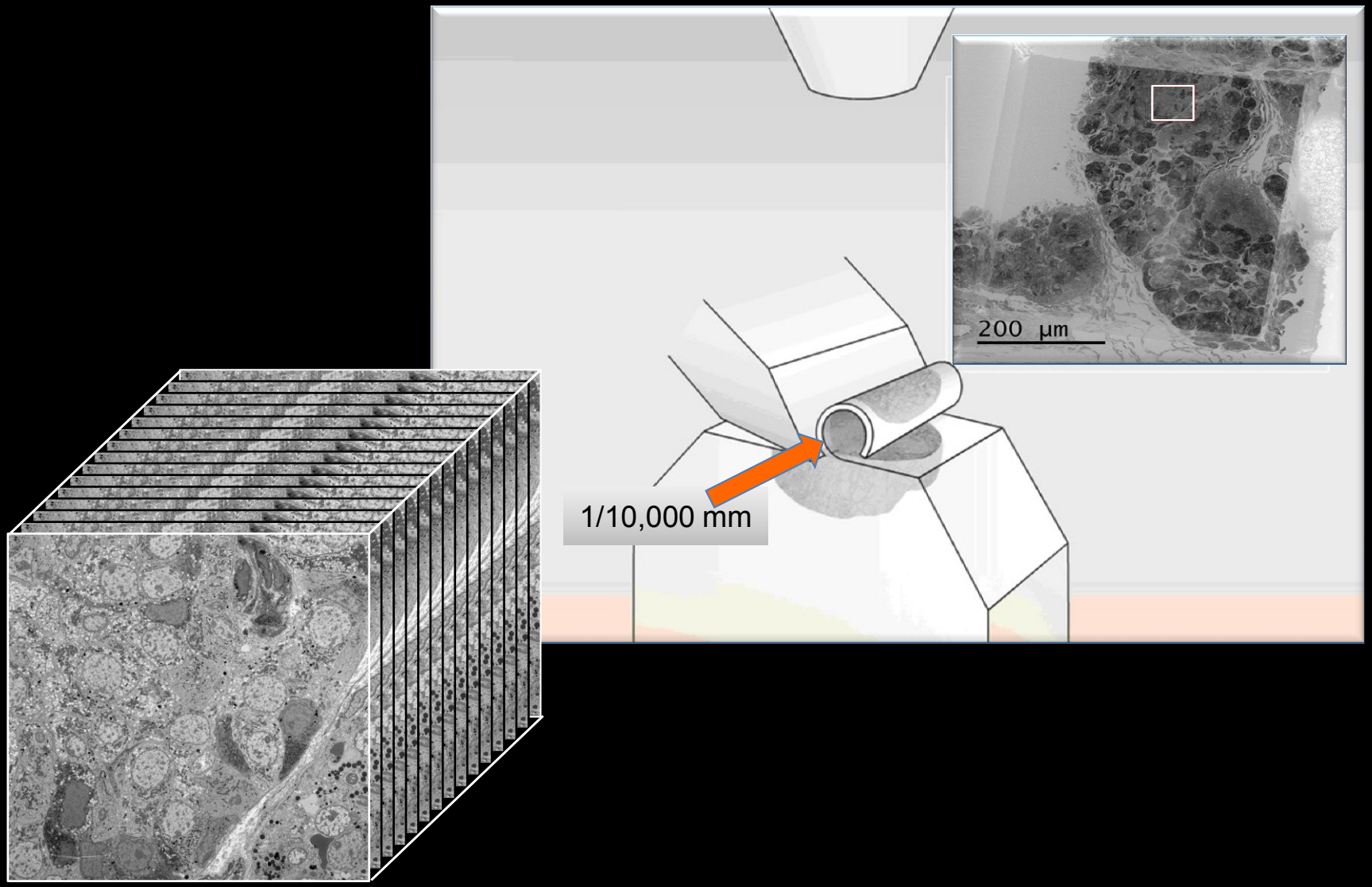
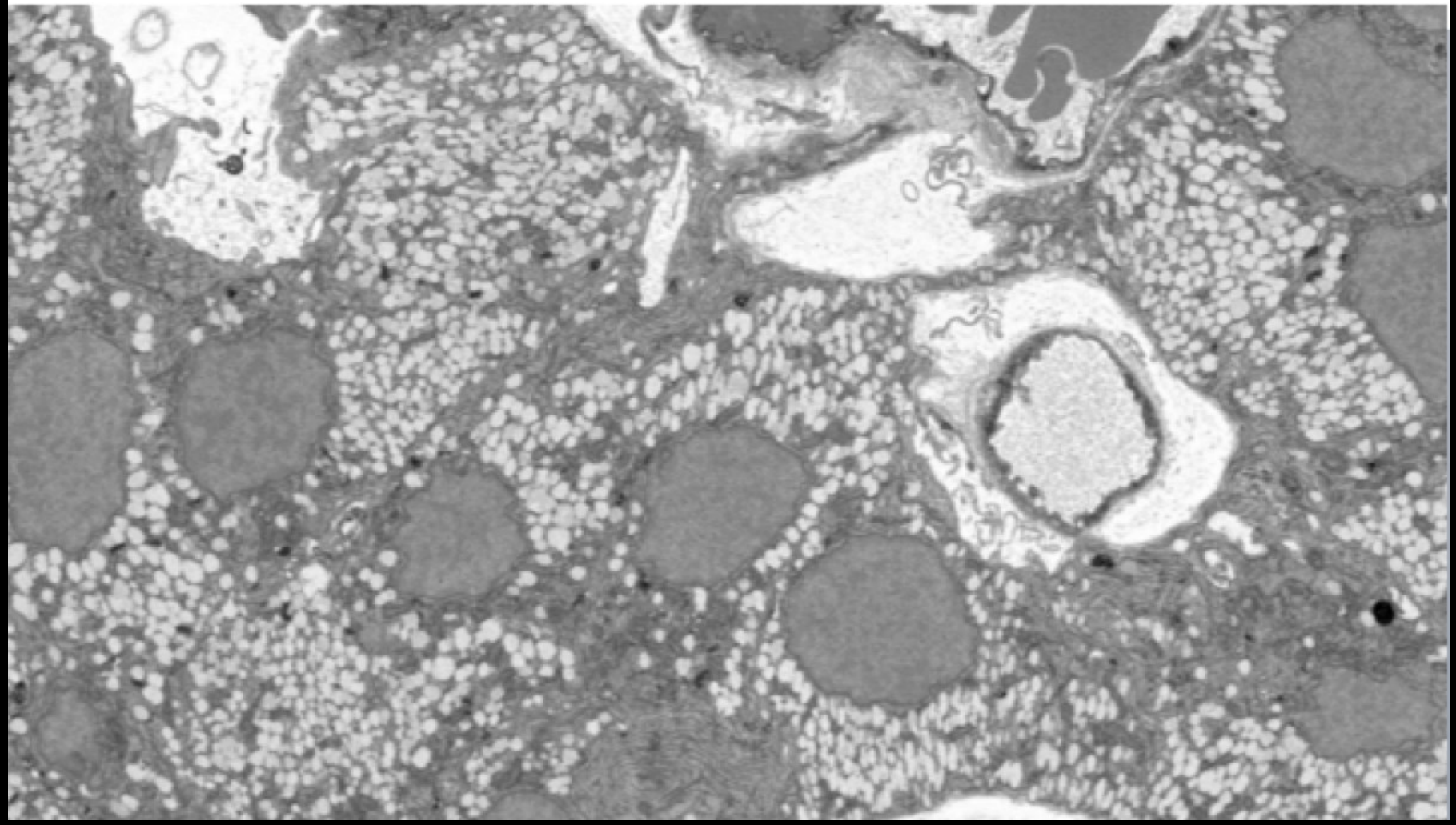
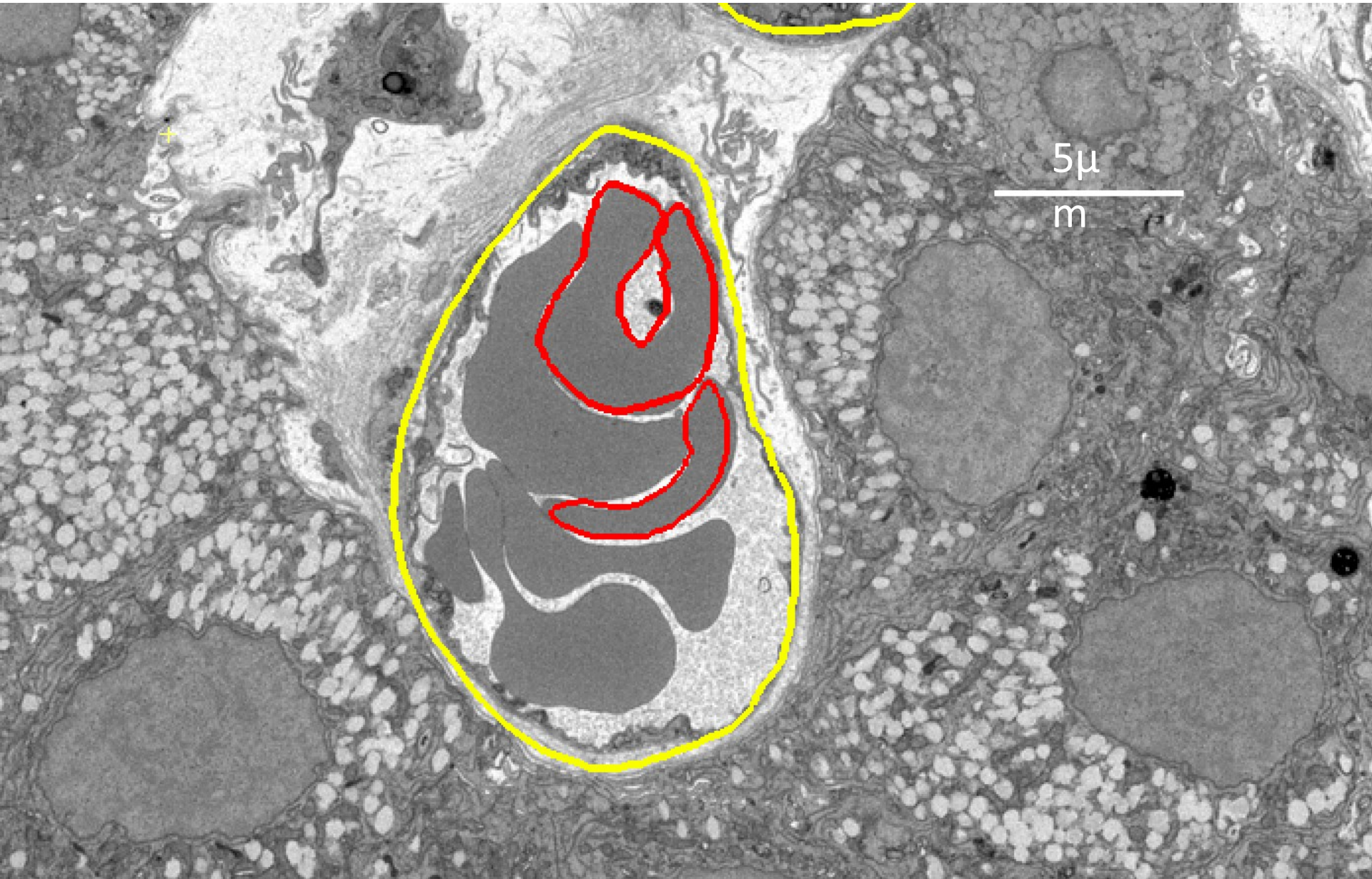


CHI Islet; Organisation of Cells Within Islet Capillary Network



Movie

CHI Islet; Digital Reconstruction



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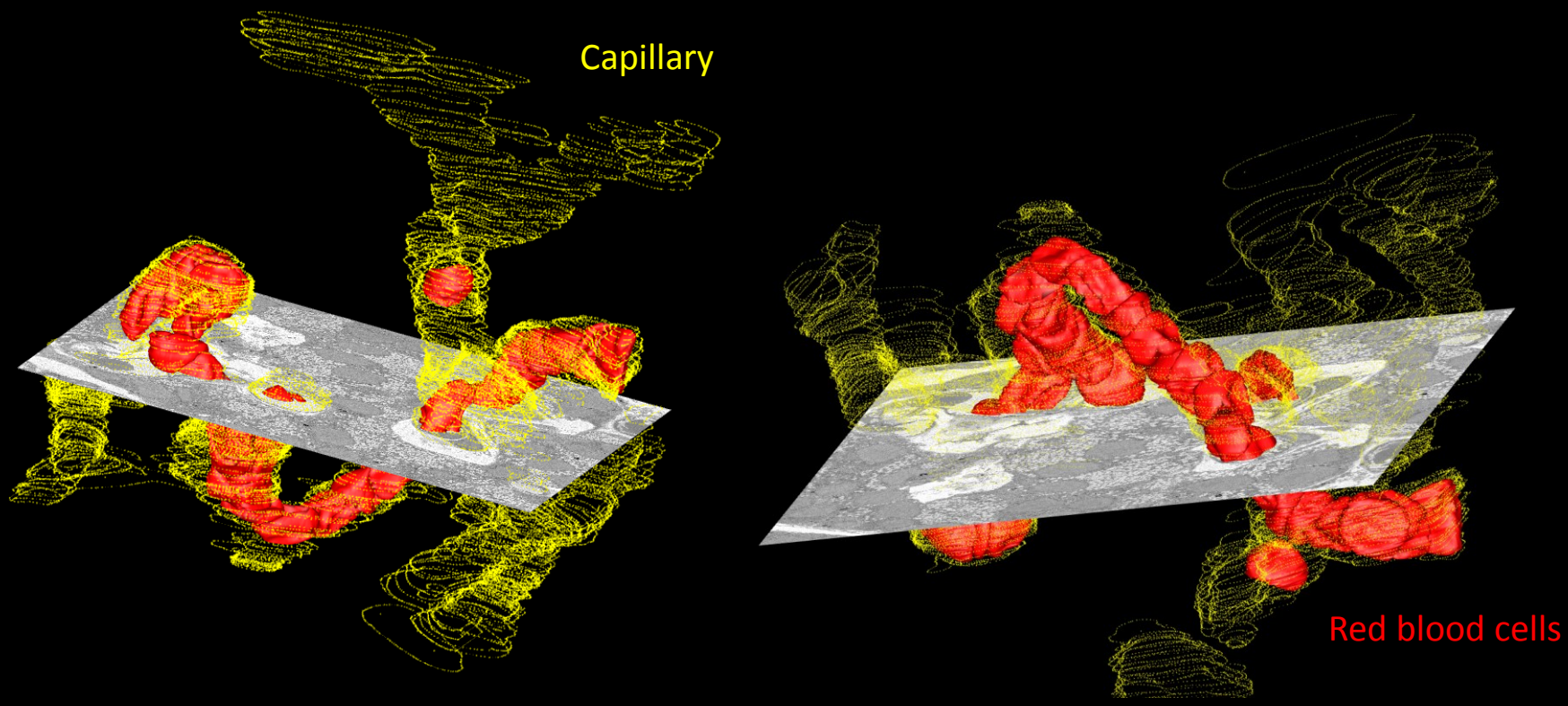
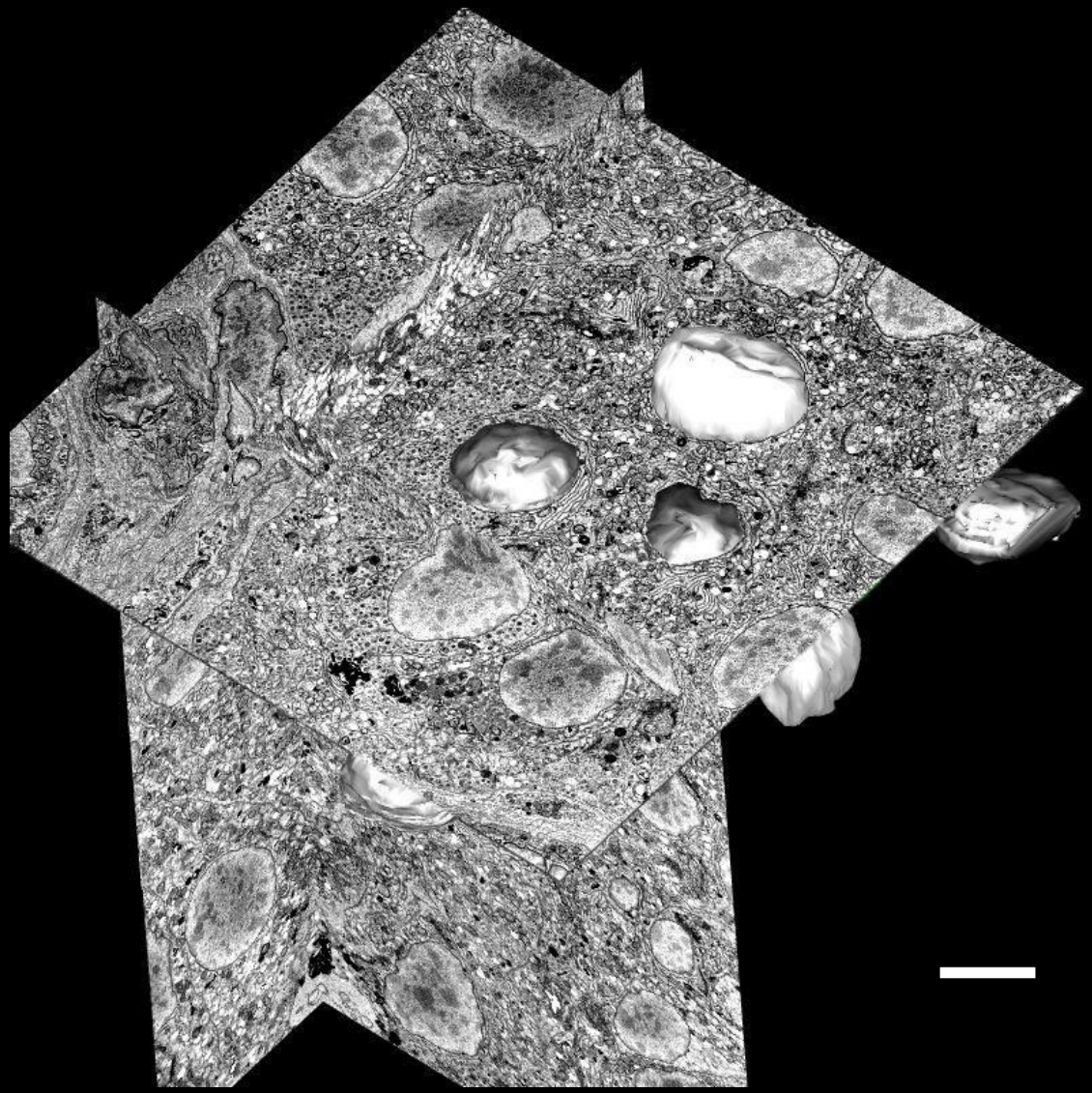


CHI Islet; Nucleomegaly

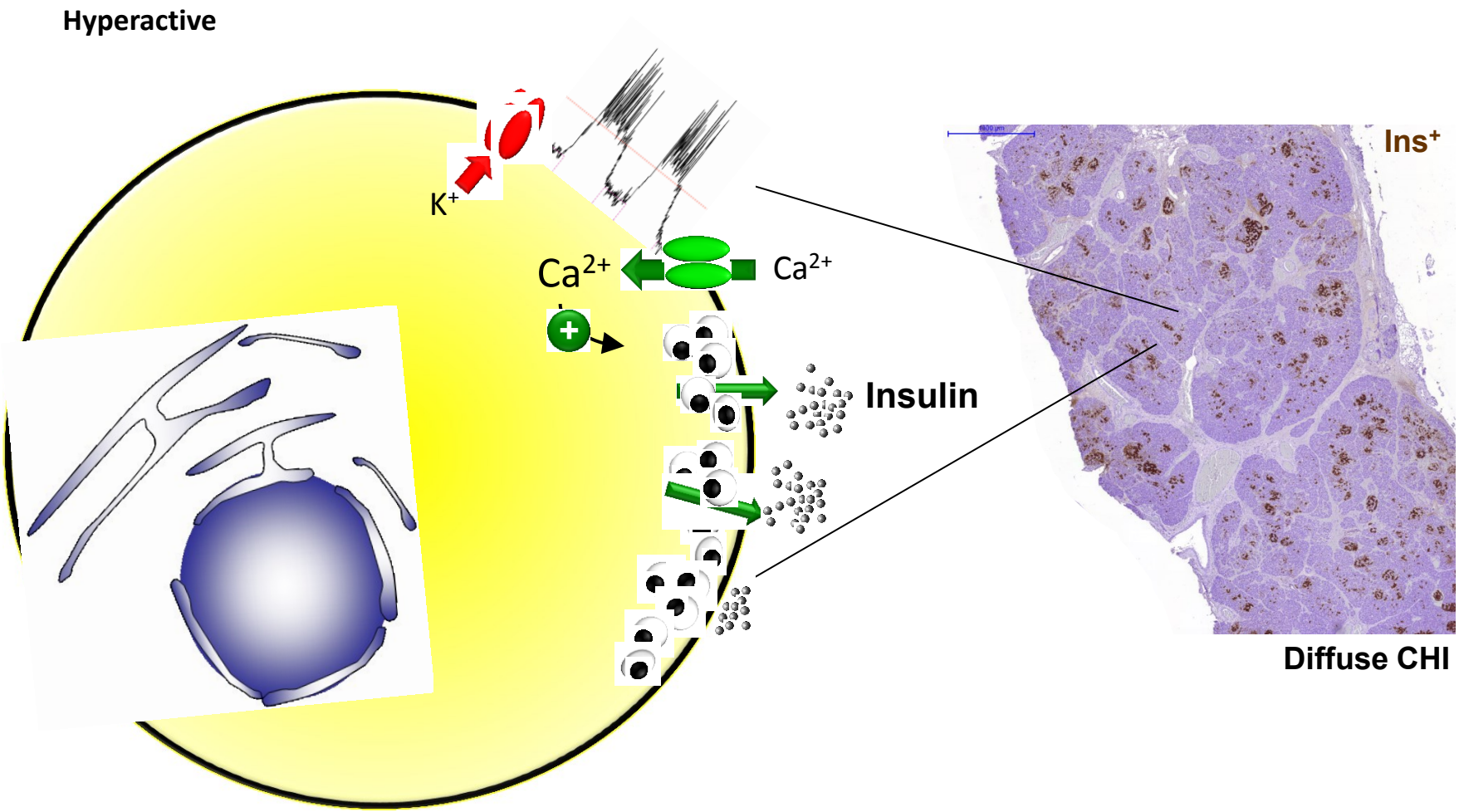


Movie

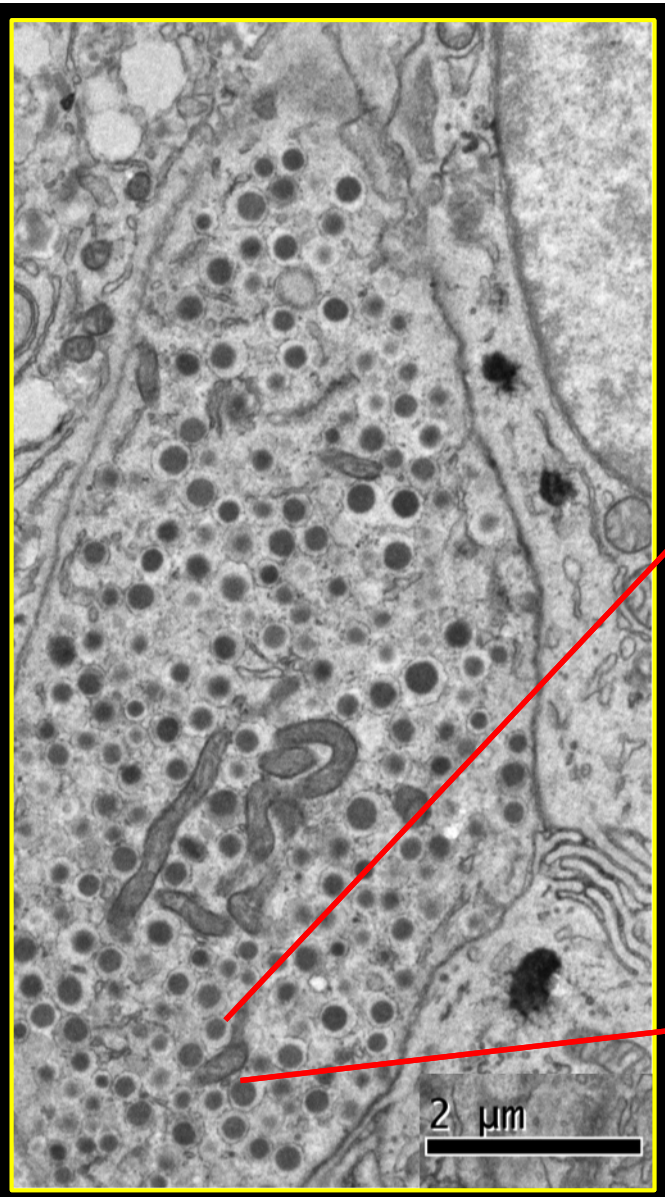
Enlarged nuclei in CHI Islets.
A normal feature, but increased in incidence in diffuse cases of CHI
Volume increase?
From approx. 160 to 450 μm^3

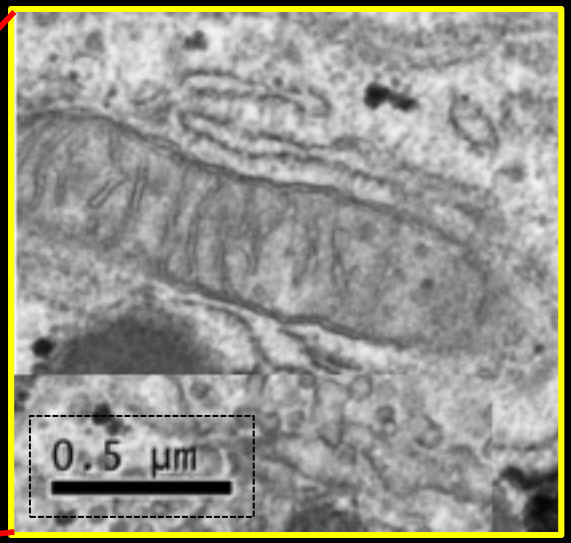
Han et al (2015) ESPE Meeting

The β-Cell in Congenital Hyperinsulinism in Infancy

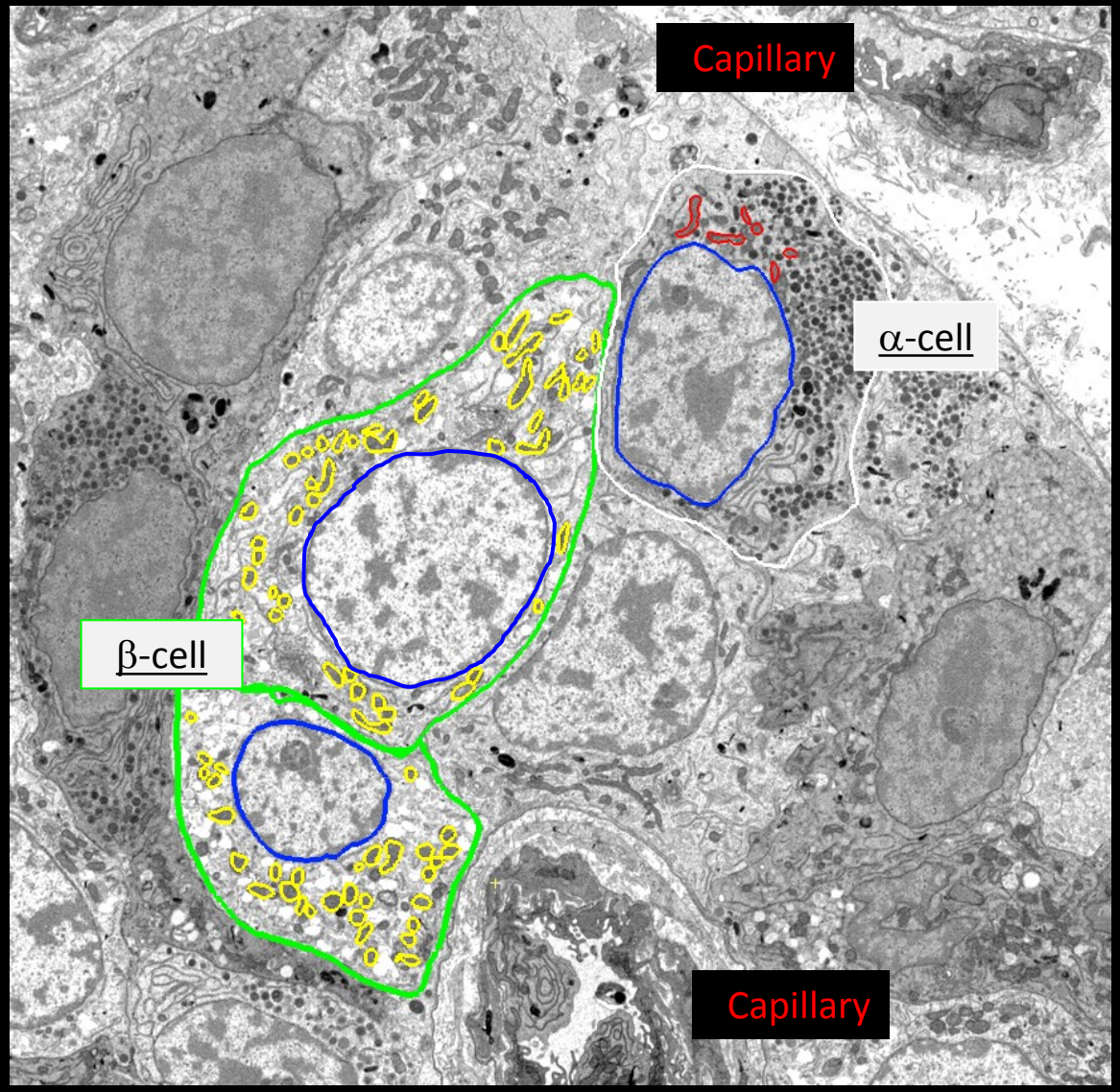


CHI Islet; Mitochondria

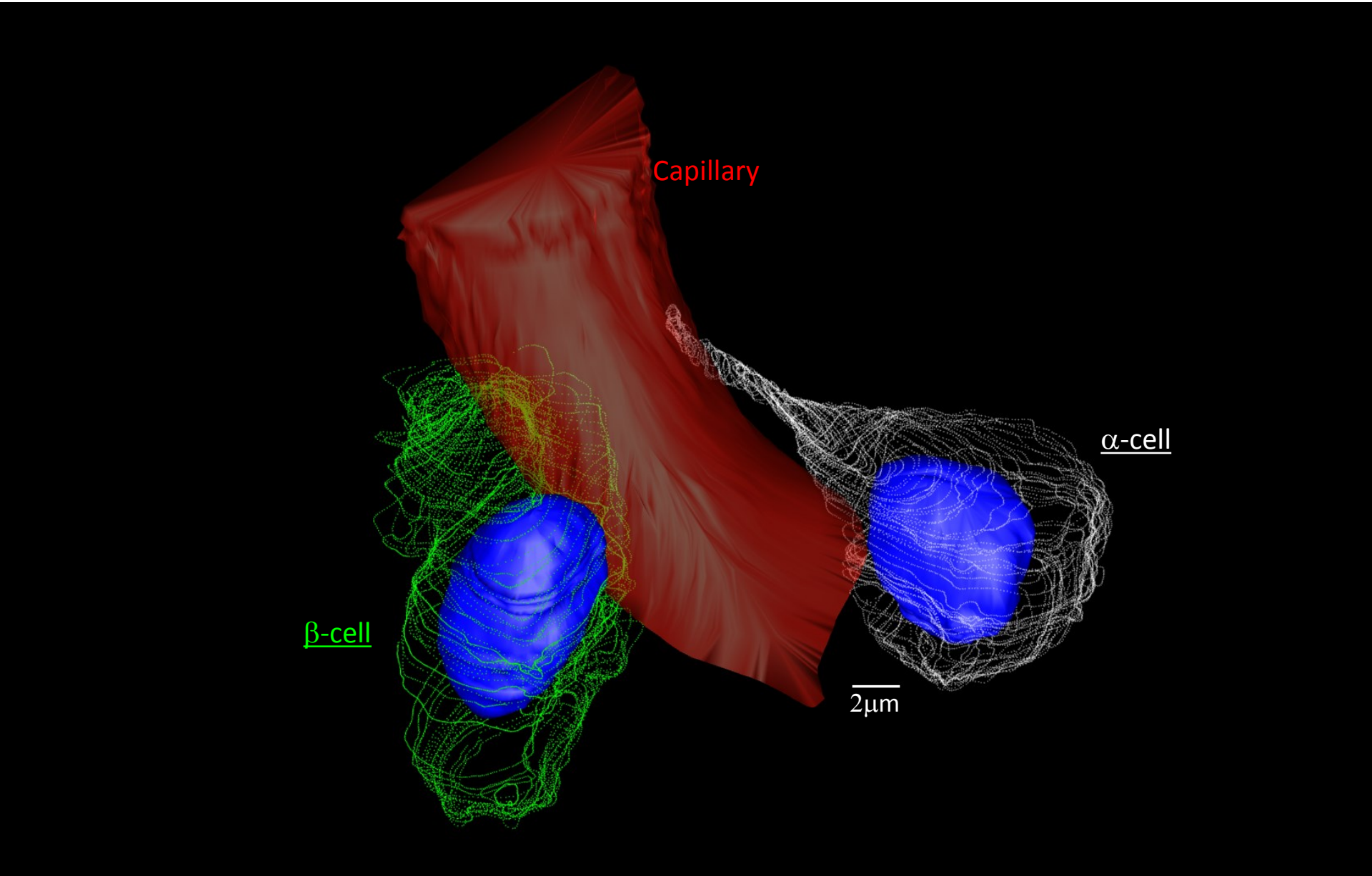




CHI Islet Cells



CHI Islet Cells; β-Cell, α-Cell & Capillary Vessel



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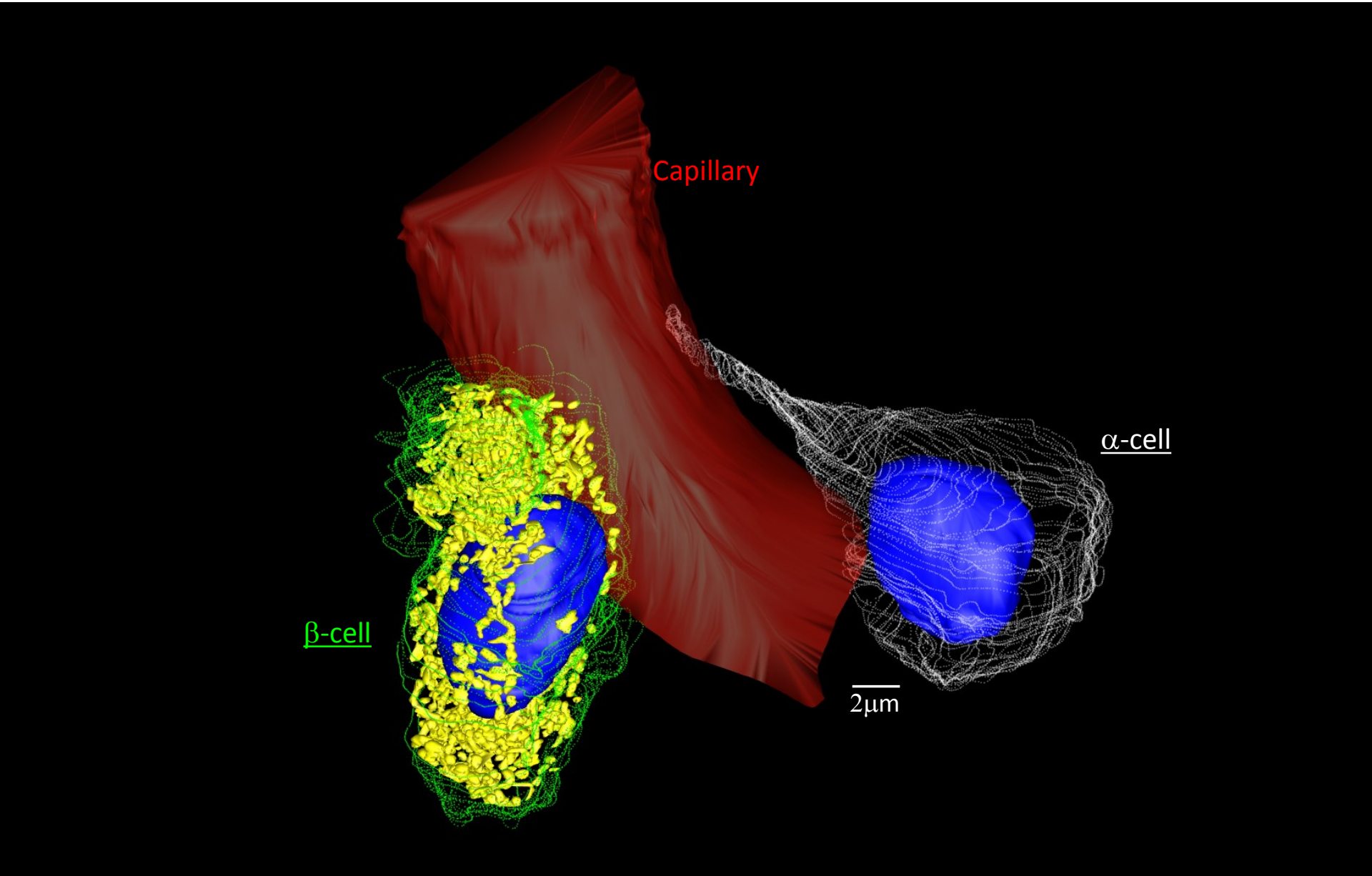

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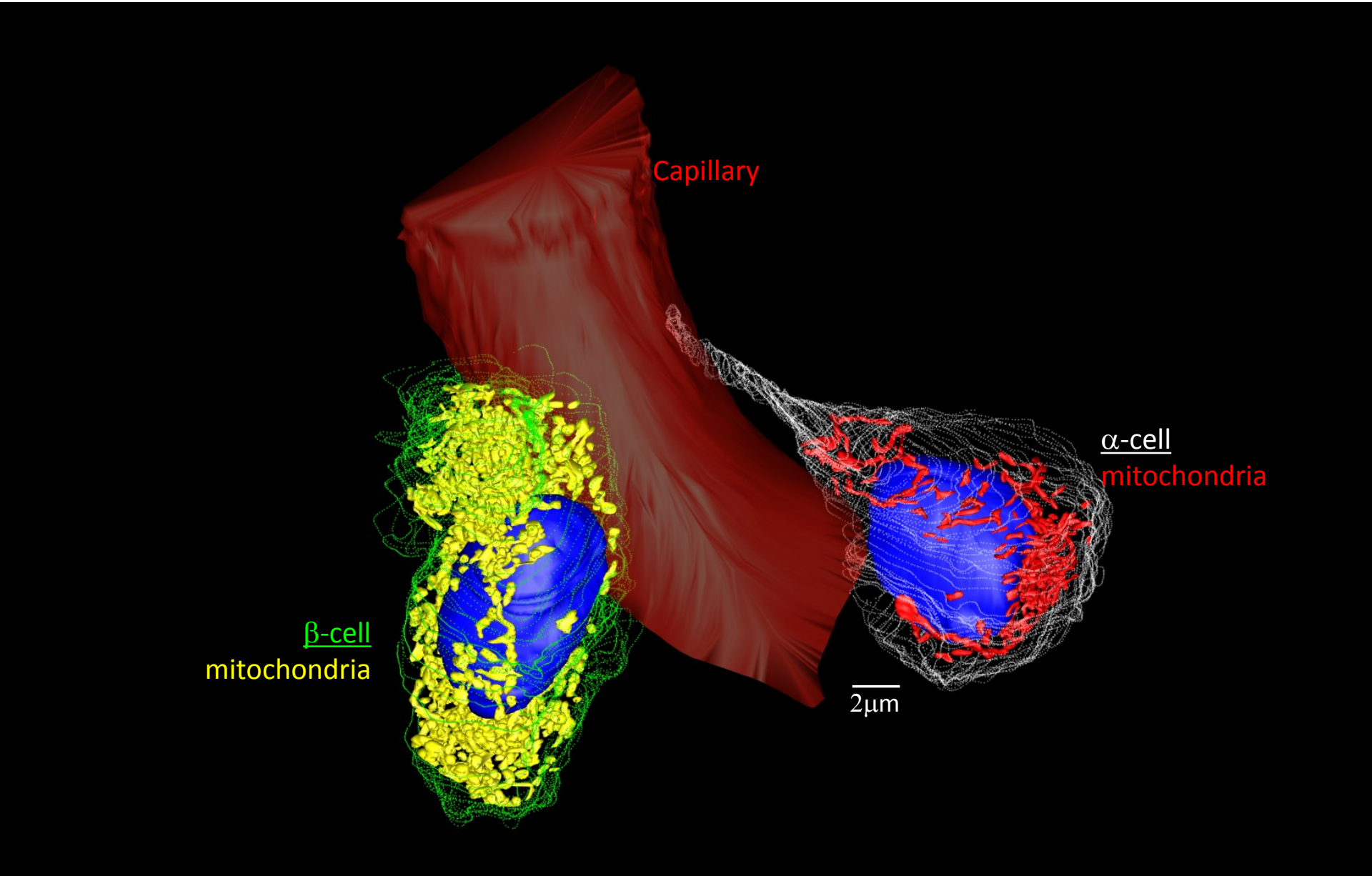
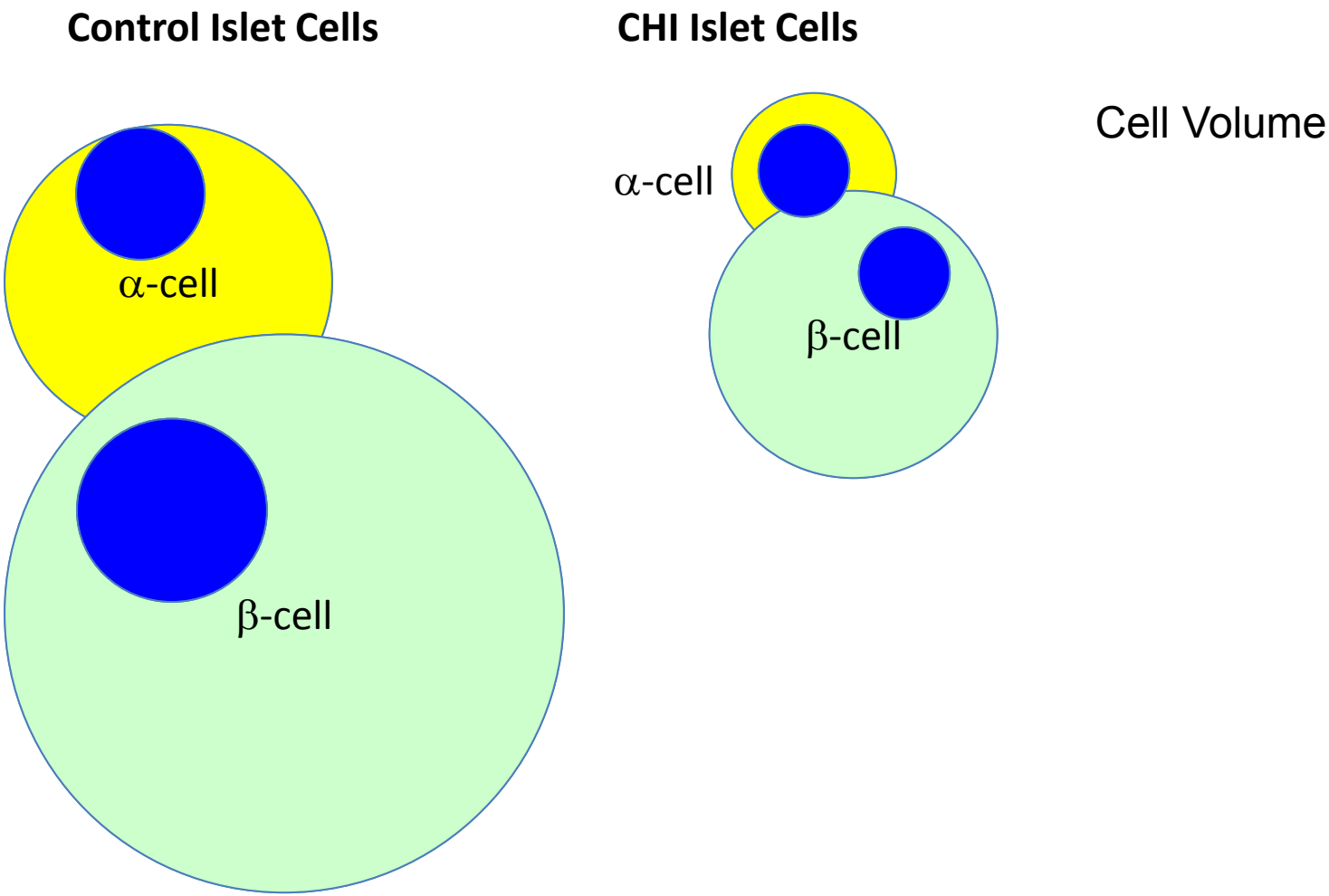


CHI Islet Cells are Smaller Than Healthy Islet Cells



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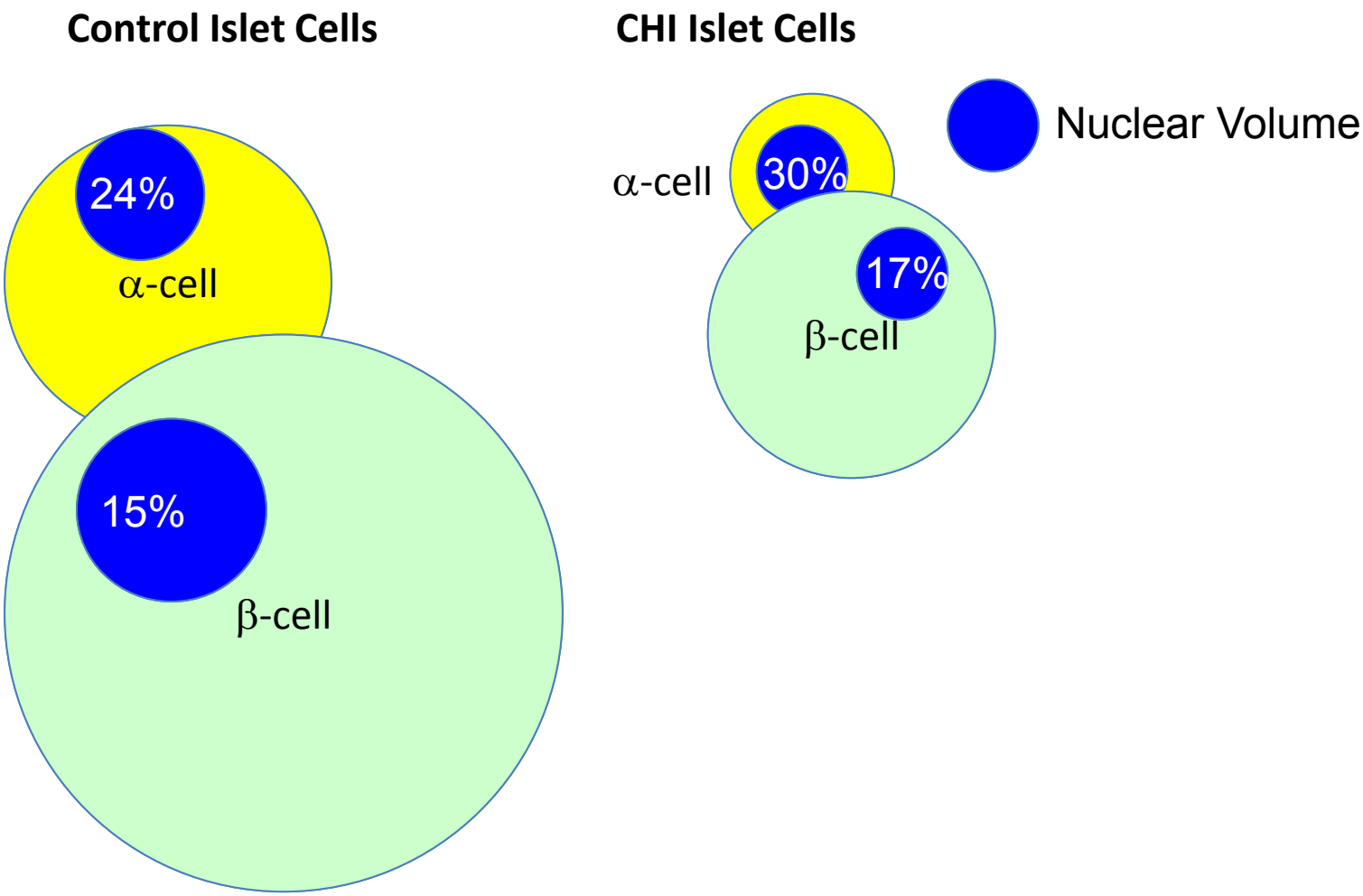
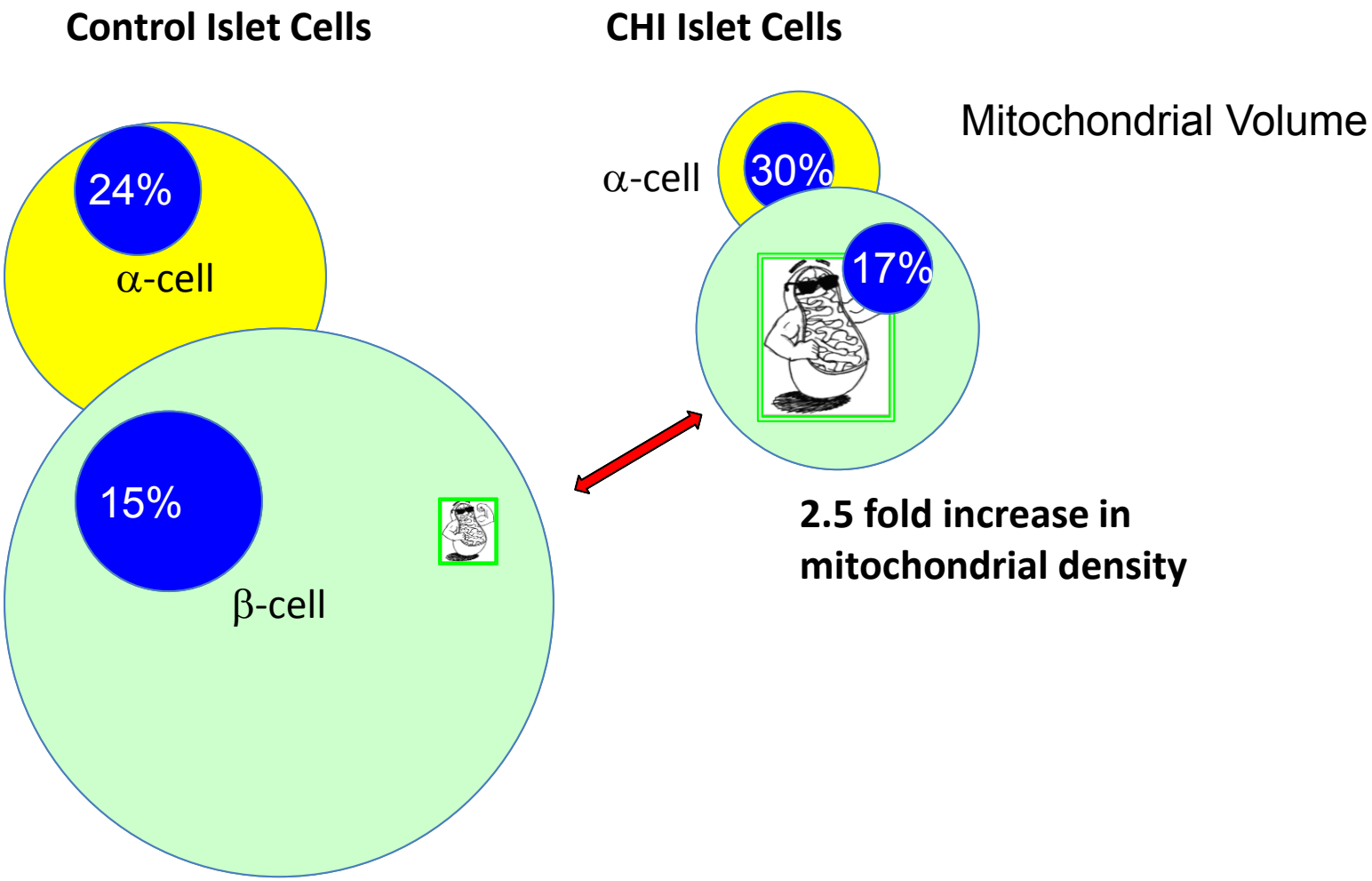


CHI Islet Cells are Smaller than Control



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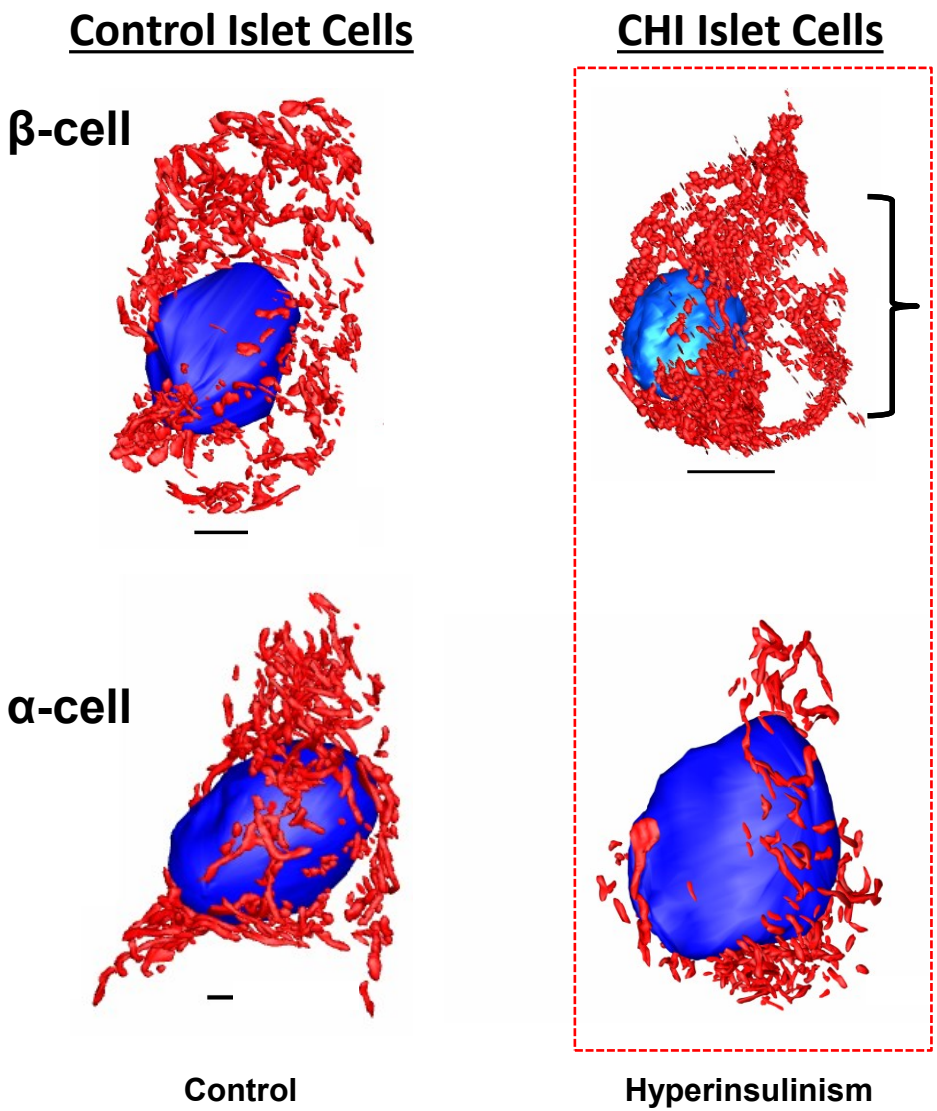
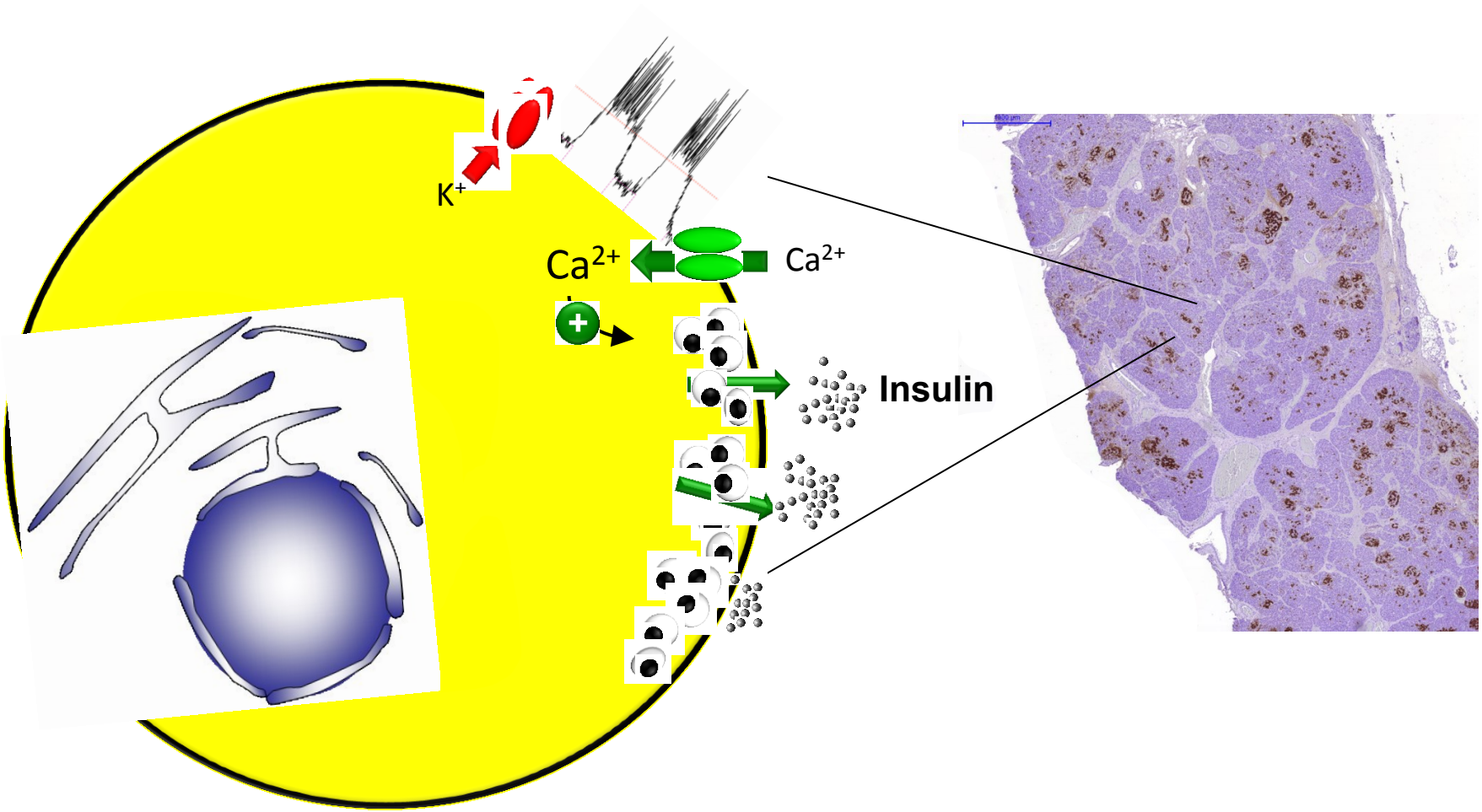


2.5 fold increase in mitochondrial density

- Helps to explain sustained insulin release
- A contribution to hyperinsulinism?

The β-Cell in Congenital Hyperinsulinism in Infancy



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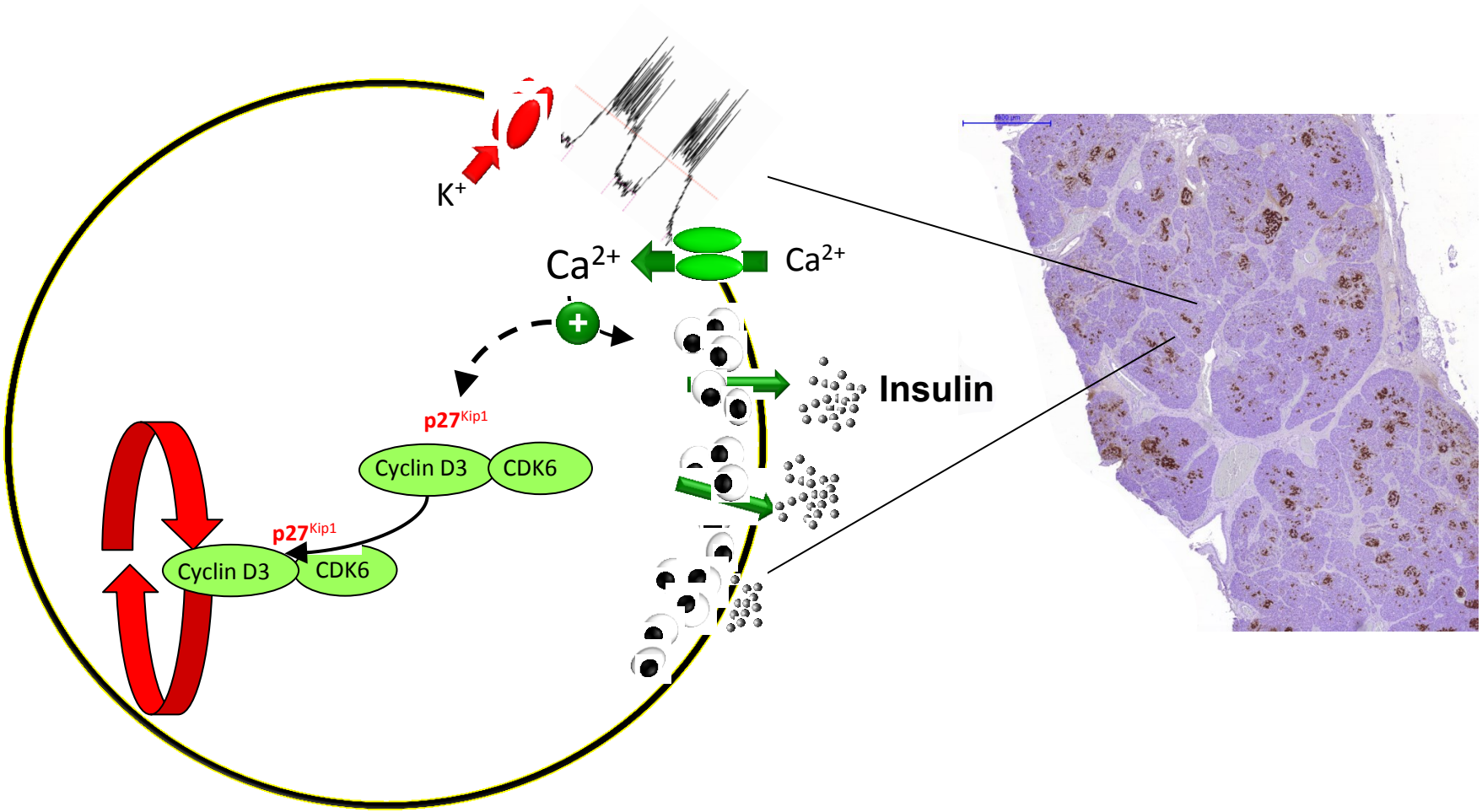

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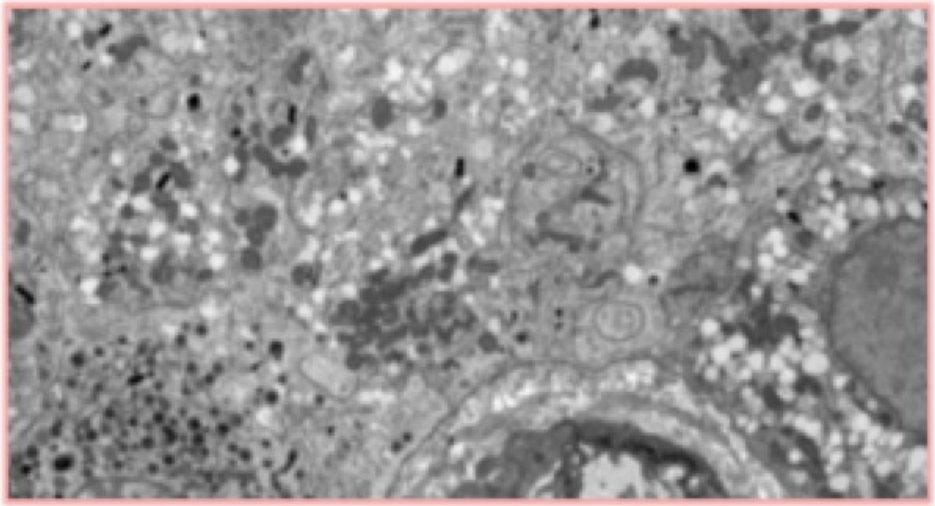
ESPE Congenital Hyperinsulinism Family Conference : Sept 30th 2015



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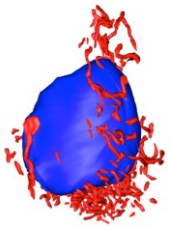

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