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Staple Strength: The Potential Role of Intrinsic Fibre Strength

Produced for the CRC for Premium Quality Wool undergraduate program by;
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Intrinsic Fibre Strength

- minimum FD and rate of change in FD cannot account for all variation in SS
- fibres of same FD at POB can differ markedly in breaking load
- suggests differences in the inherent strength of fibre material
 - chemical composition
 - arrangement of cell types

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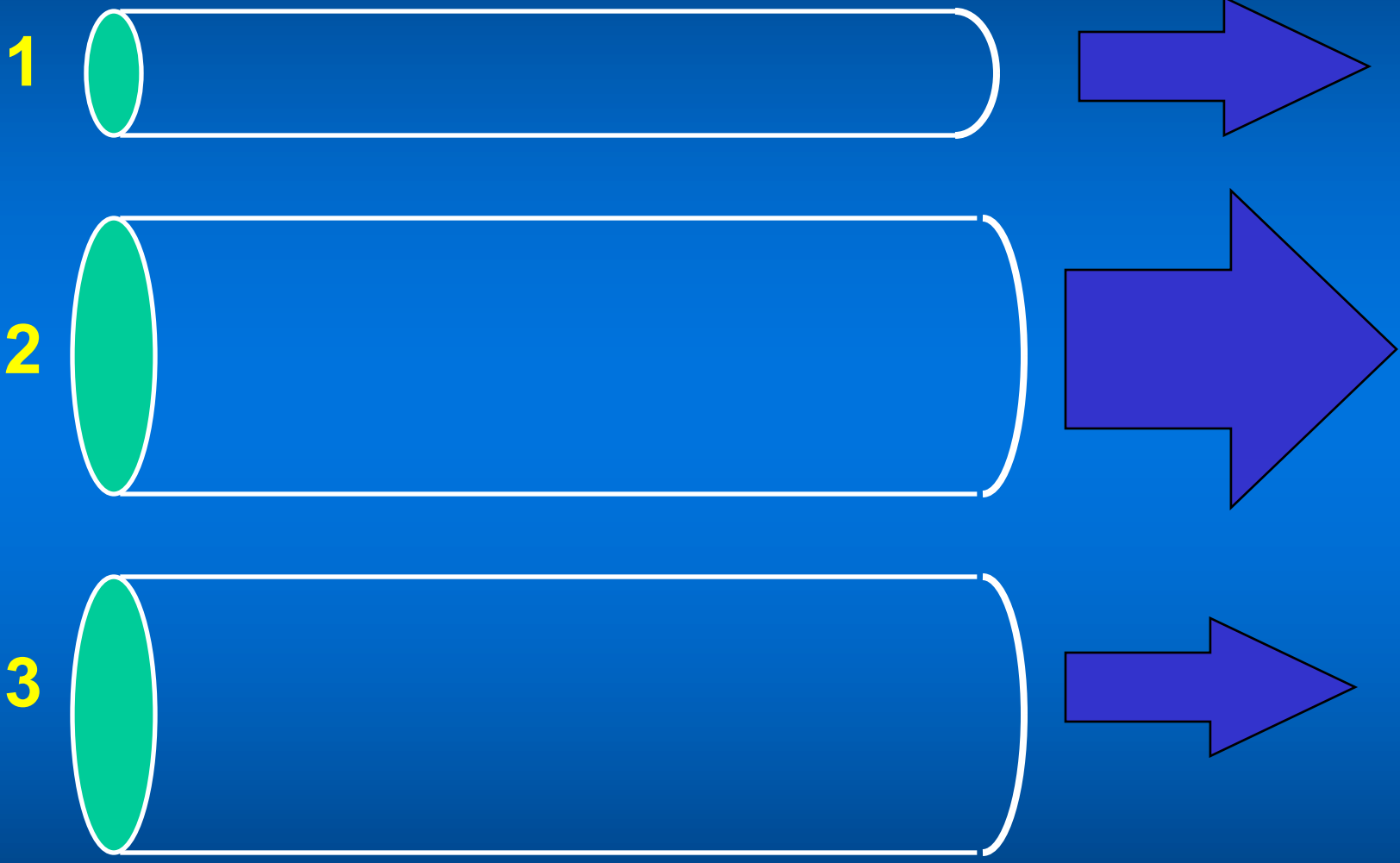
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Intrinsic Fibre Strength



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Cortical cell types

- **orthocortex and paracortex**
 - chemically and structurally different
- **staple strength may decline with increasing % of paracortex BUT not conclusive**
- **relative proportions can vary along the fibre and can be influenced by nutrition**
 - fibres are chemically and structurally variable along their length, but is this important?
- **finer fibres have higher % paracortical cells**
 - does this explain why finer fibres may be weaker?

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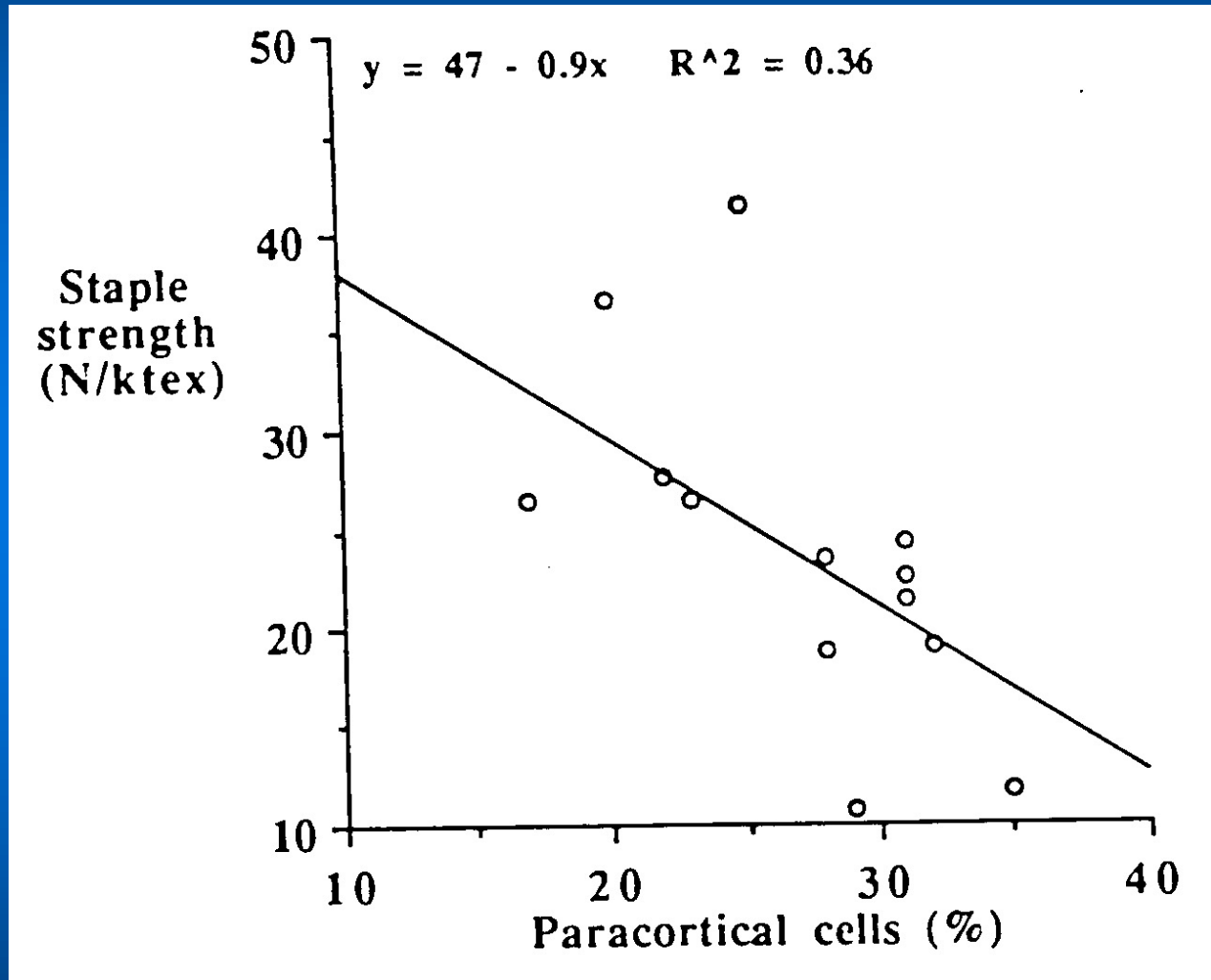
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Staple strength vs % paracortical cells

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Staple strength vs cortical cell types

Table 2 Correlation coefficients (r) among staple strength (SS), fibre diameter (FD) and the proportions of ortho-, meso-, and paracortex

	Across treatment groups (df=24)		Within treatment groups (df=21)	
	SS (N/ktex)	FD at POB (um)	SS (N/ktex)	FD at POB (um)
FD at POB (um)	0.691**		0.372	
Ortho- (%)	0.272	0.209	0.292	0.099
Meso- (%)	-0.151	-0.142	-0.178	-0.098
Para- (%)	-0.215	-0.138	-0.188	-0.024

**P < 0.01

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