

Overview of Gel Filtration

This chapter describes a set of “spin columns” that:

- Are ready to use
- Take just minutes to purify nucleic acids from unincorporated nucleotides, linkers, or excess primers
- Fit in most common tabletop/clinical centrifuges and low-speed floor model centrifuges (Quick Spin Columns) or
- Fit in microcentrifuges (mini Quick Spin Columns)

For a quick overview of each of these products, continue reading this article. Or, for detailed information on the product most relevant to your research, turn to the page that describes the product in detail:

If you are interested in	For preparing	See page
Quick Spin Columns	Labeled DNA or RNA, free of nucleotides and other small molecules	196
mini Quick Spin Columns	Labeled DNA, RNA or oligonucleotides, free of nucleotides and other small molecules	200

Principle of gel filtration chromatography

All the products described in this chapter depend on gel filtration chromatography, which separates molecules based on their relative size. This type of chromatography was originally described by Porath and Flodin (1959) for the desalting of proteins.

If a molecule can enter and exit the pores of the gel matrix, its rate of movement is determined by the flow of the chromatographic buffer and the diffusion properties of the molecule. The matrix thus functions like a molecular sieve. Smaller molecules enter and leave many pores of the matrix, thus traversing the length of the column relatively slowly. Larger molecules do not enter the gel pores and therefore elute rapidly from the column.



Overview of the Quick Spin method

Roche Applied Science has adapted gel filtration technology to a spin column format for use in a wide range of applications, including removal of:

- Unincorporated nucleotides from labeling reactions
- Fluorescent dye-labeled didexoy terminators.

Quick Spin Columns are:

- **Simple**
Prespin column, apply an undiluted sample to the column bed, and centrifuge the column for a few minutes to recover the purified DNA or RNA.
- **Fast**
Quick Spin Columns for radiolabeled DNA or RNA purification can separate unincorporated radionucleotides from labeled DNA or RNA in approximately 6 min.
- **Convenient**
The columns are ready-to-use and are even supplied with collection tubes.
- **Longer than most spin columns**
Longer columns provide more effective separation, leading to higher yields of DNA or RNA, with fewer contaminating nucleotides, linkers or primers.
- **Quality tested**
Columns are quality tested to ensure the absence of nucleases, maximum recovery of nucleic acid, and maximum retention of small unincorporated molecules.

Reference

Porath, J. and Flodin, P. (1959) *Nature* **183**, 1657 – 1659

